



Sidock Architects

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'A Sidock Group Company'

Addendum Write Up

Addendum: 05

Project: 14049 Dexter Township, Michigan New Fire Sub-Station No 2

Issue Date: October 20, 2014

Addendum Reason: Additional Bid Items and Value Engineering

Drawings Issued: G-002, C-110, C-200, C-220, C-230, C-240, C-250, C-300, C-400, C-801, C-805, C-806, L-210, and L-801.

Description: Additional Bid Items and Value Engineering

Item	Description
------	-------------

- | | |
|----|---|
| 1. | The Township has made miscellaneous revisions to the site drawings. Please review the attached drawings and make the appropriate revisions to your bid. Provide a new bid breakdown, to include all adds. |
| 2. | The bids came in substantially over budget. As such the Township needs to examine any and all possible cost savings alternatives in order to avoid cancelling the project. You are encouraged to submit voluntary alternates, with associated deducts and details. |
| 3. | Please provide alternate deducts for the following items: <ul style="list-style-type: none">a. Delete the gravel training pad and all associated work.b. Delete the 3,500 gallon underground water storage tank and all associated piping and electrical.c. Delete the 53'x61' turnaround on the south side of the station.d. Delete the two parking spaces to the east of the roadway.e. Delete the 7 parking spaces to the east of the station, including all curbing, sidewalks, and lighting.f. Eliminate all tree re-location.g. Provide sealed concrete floors in the Apparatus Bays. Floors to be non-slip surface.h. Provide sealed concrete floors in the kitchen/common room, corridors, office, and watch room. Floors to be non-slip surface.i. Eliminate the westernmost drive-thru bay.j. Eliminate the front and rear apparatus bay gables. |

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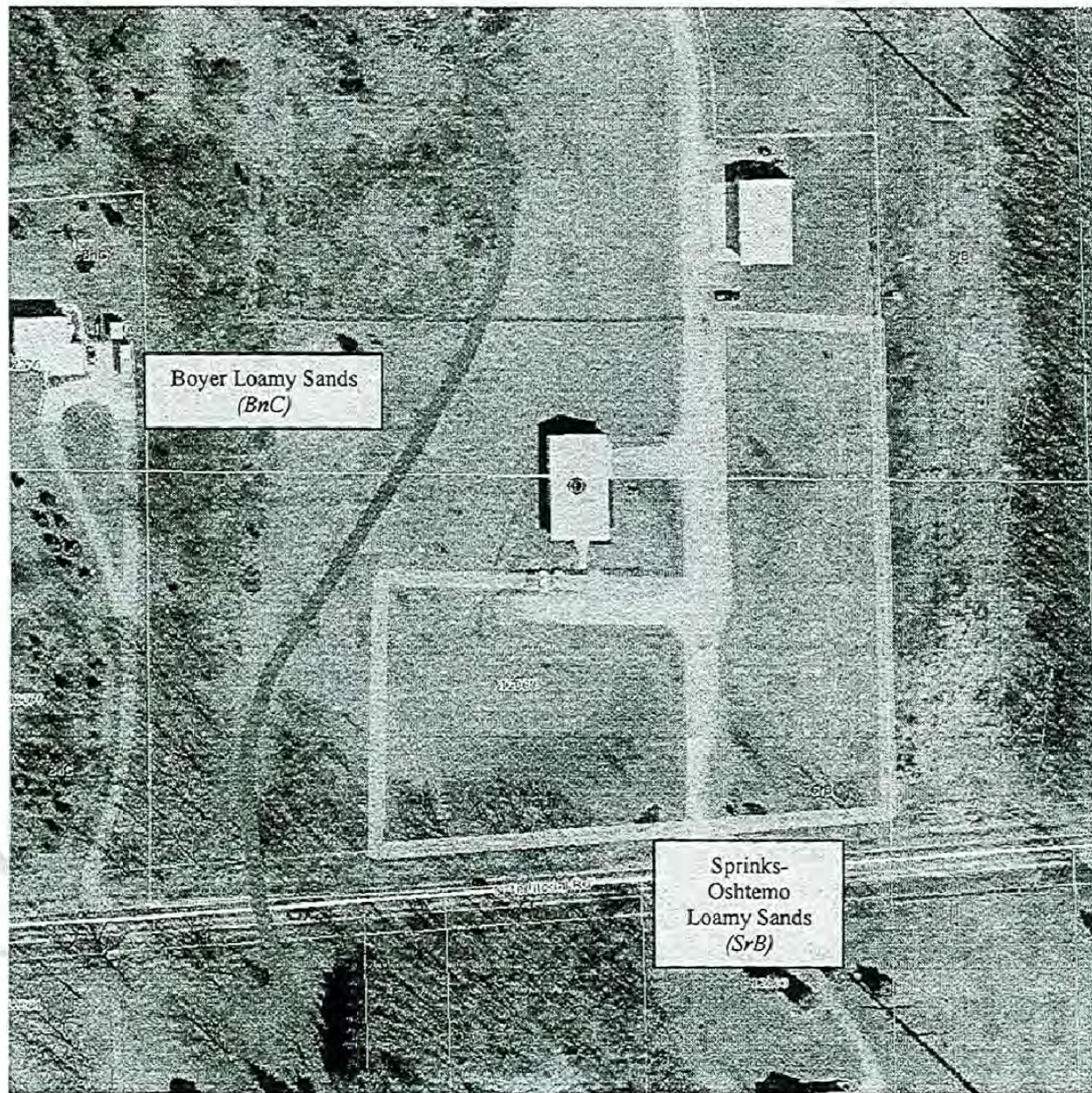
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- k. Remove canopies at all man doors except the main north entrance.
- 4. Revised proposals are due on Tuesday October 28, 2014.

End of Addendum 05

Limitation on Small Commercial Buildings						Soil Description
Soil Name	Slope	Location	Commercial Buildings	Limitation on Drainage	Proposed Land Use	
Sprinks-Osherno Loamy Sands (SrB)	0-6%	Entire Proposed Site	Not Limited	Very Limited: Cutbanks cave, slope	Open Space, Fire Substation, Parking, Driveways	This soil is on broad uplands on outwash plains, in valley trains, and on moraines. Slopes are uniform in some areas and short and complex in others. Areas range from 3 to about 160 acres in size. This soil is droughty and subject to soil blowing when cultivated. Runoff is slow and very slow. Some small areas are irrigated and used for truck crops and small fruit. Some small areas are in urban uses.

Soils Map (Washtenaw County GIS)

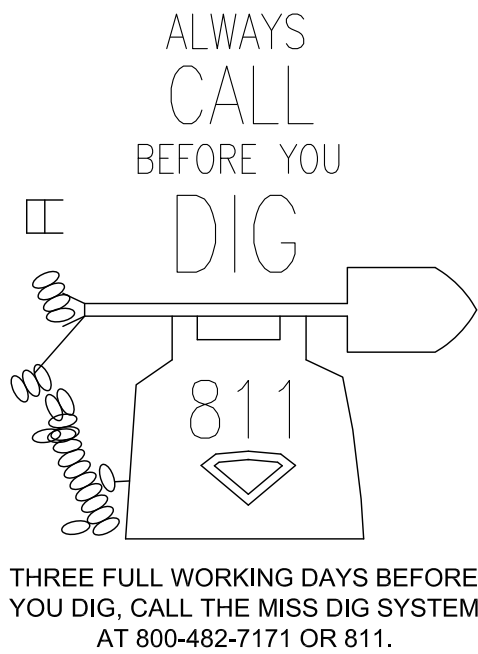


LEGEND OF ABBREVIATIONS

@	- AT
APPROX.	- APPROXIMATELY
~	- APPROXIMATELY
ASPH.	- ASPHALT
B/	- BOTTOM OF
B/B	- BACK TO BACK
B/C	- BACK OF CURB
B.O.C.	- BACK OF CURB
B.O.P.	- BOTTOM OF PIPE
CB	- CATCH BASIN
CL	- CENTERLINE
CL	- CLASS
CMP	- CORRUGATED METAL PIPE
C.O.	- CLEAN OUT
CONC.	- CONCRETE
C.P.	- CENTER POINT
CPPP	- CORRUGATED PERFORATED PLASTIC PIPE
DEMO.	- DEMOLITION
E	- EAST
EL.	- ELEVATION
ELE	- ELECTRICAL
ES	- END SECTION
EX.	- EXISTING
EXIST.	- EXISTING
F	- HYDRANT FLANGE BREAK ELEVATION
FF	- FINISHED FLOOR
F/F	- FACE TO FACE
G	- GUTTER ELEVATION
GV&W	- GATE VALVE & WELL
H.P.	- HIGH POINT
HY	- HYDRANT
IN	- INLET
I.E.	- INVERT ELEVATION
L.P.	- LOW POINT
(M)	- MATCH
MAX.	- MAXIMUM
MH	- MANHOLE
MIN.	- MINIMUM
N	- NORTH
O.C.	- ON CENTER
P.C.	- POINT OF CURVATURE
PR.	- PROPOSED
P.T.	- POINT TANGENT
PROP.	- PROPOSED
RCP	- REINFORCED CONCRETE PIPE
R	- RADIUS
R.O.W.	- RIGHT OF WAY
RR	- RAIL ROAD
S	- SOUTH
s	- ARC LENGTH
SAN	- SANITARY SEWER
STN	- ROAD STATION
STW	- STORM SEWER
T/	- TOP OF
T/C	- TOP OF CURB
T/P	- TOP OF PAVEMENT
T/W	- TOP OF WALK
TD	- TRENCH DRAIN
T.O.P.	- TOP OF PIPE
TYP.	- TYPICAL
U.P.	- UTILITY POLE
UNGD.	- UNDERGROUND
UNO	- UNLESS NOTED OTHERWISE
W	- WEST
W/	- WITH
WM	- WATER MAIN
WS	- WATER SERVICE
Ø	- DIAMETER

PIPE SIZE DESIGNATION

XX' - XX"
↑
↑
↑
OF
FEET
EX. 89' - 12"
MEANS 89 FEET OF 12"Ø PIPE



MISS DIG

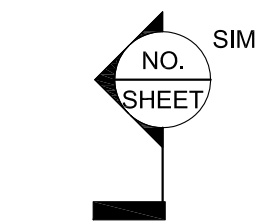
SYMBOL LEGEND

DET. SHEET TITLE SCALE: X/X" = 1'-0"

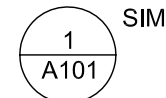
TITLE SCALE: X/X" = 1'-0"

DETAIL REFERENCE

DRAWING REFERENCE



SECTION REFERENCE



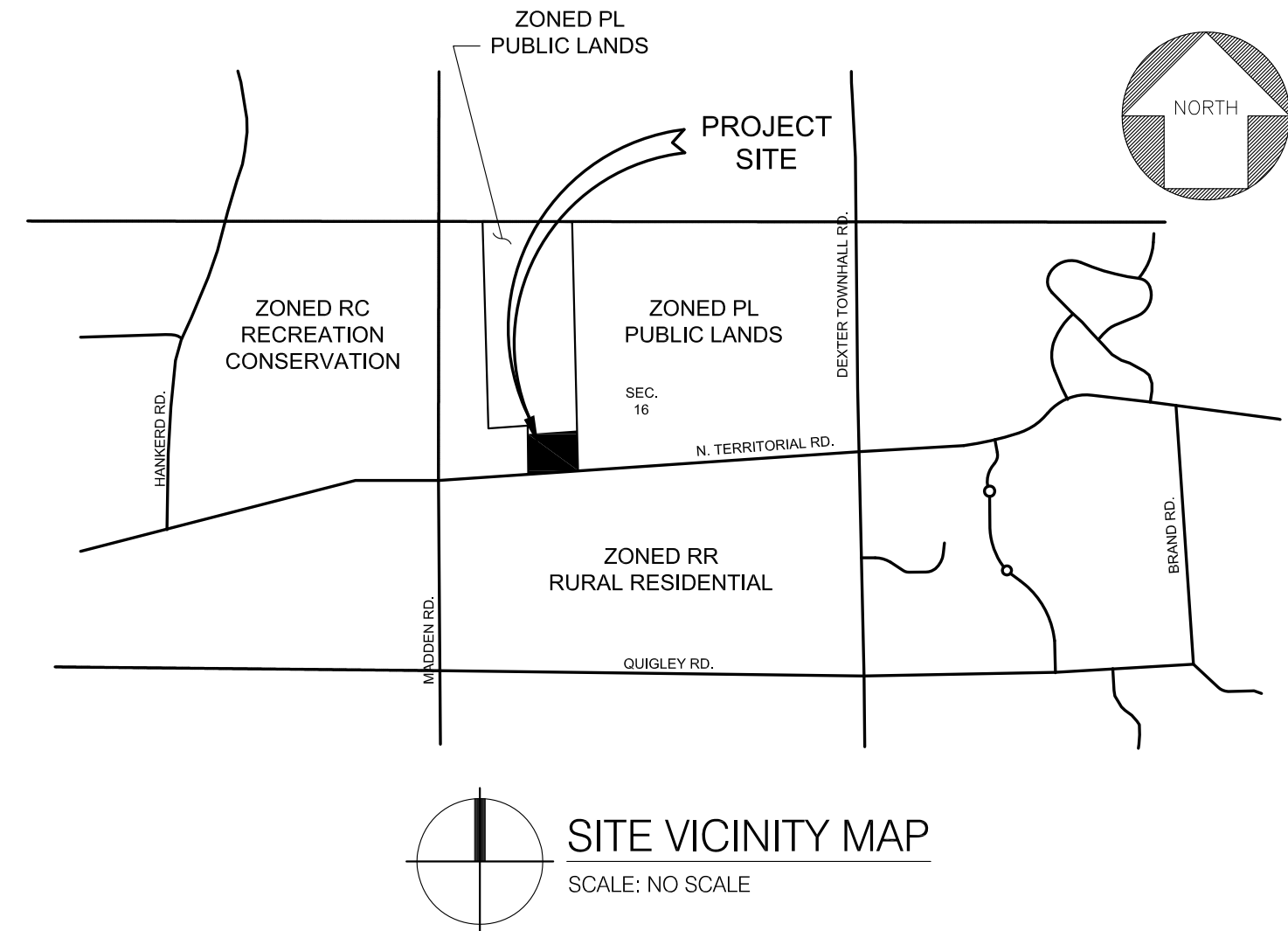
PLAN DETAIL

CIVIL SYMBOLS LEGENDS

---	GRADE CONTOUR	---
---	STORM SEWER	---
---	SANITARY SEWER	---
---	COMBINATION SEWER	---
---	WATER MAIN	---
---	GAS LINE	---
---	ELECTRICAL LINE	---
---	CURB AND GUTTER	---
---	FENCE	---
---	CLEAN OUT	---
---	SANITARY/STORM WATER MANHOLE (SOLID COVER)	---
---	STORM MANHOLE (OPEN COVER)	---
---	STORM CATCH BASIN/INLET (OPEN COVER)	---
---	STORM END SECTION	---
---	TRENCH DRAIN	---
---	SQUARE PIPE END	---
---	PLUG, CAP OR BULKHEAD	---
---	FIRE HYDRANT	---
---	WATER VALVE	---
---	GRADE ELEVATION	---
---	LIGHT POLE	---
---	SIGN	---
---	SILT FENCE	---
---	CHECK DAM	---
---	PIPE FLOW DIRECTIONAL ARROW	---
---	CB/IN FILTER	---
---	DRAINAGE FLOW ARROW	---
---	DRAIN AREA DESIGNATION	---
---	ASPHALT PAVING	---
---	CONCRETE PAVING	---
---	LAWN	---
---	GRAVEL	---
---	RIP RAP	---
---	STONE	---

SHEET INDEX			
NO.		DATE	DRAWN BY
GENERAL			
G-001	COVER SHEET	10/13/2014	SIDOCK ARCHITECTS
G-002	ABBREVIATIONS, SYMBOLS, & SHEET INDEX	10/13/2014	SIDOCK ARCHITECTS
BY OTHERS			
TS-1	SITE TOPOGRAPHIC/TREE SURVEY	02/10/2014	ENVIRONMENTAL ENGINEERS, INC.
CIVIL			
C-000	CIVIL GENERAL NOTES	10/13/2014	SIDOCK ARCHITECTS
C-100	EXISTING SITE PLAN	10/13/2014	SIDOCK ARCHITECTS
C-110	SITE DEMOLITION PLAN	10/13/2014	SIDOCK ARCHITECTS
C-200	GENERAL SITE PLAN	10/13/2014	SIDOCK ARCHITECTS
C-201	PHOTOMETRIC PLAN	10/13/2014	SIDOCK ARCHITECTS
C-210	SITE DIMENSION PLAN	10/13/2014	SIDOCK ARCHITECTS
C-220	SITE GRADING PLAN	10/13/2014	SIDOCK ARCHITECTS
C-230	SITE UTILITY PLAN	10/13/2014	SIDOCK ARCHITECTS
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C-300	STORM SEWER PROFILES	10/13/2014	SIDOCK ARCHITECTS
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C-801	DETAILS - PAVING	10/13/2014	SIDOCK ARCHITECTS
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C-803	DETAILS - WATER AND SANITARY SERVICE	10/13/2014	SIDOCK ARCHITECTS
C-804	DETAILS - STORM SEWER	10/13/2014	SIDOCK ARCHITECTS
C-805	DETAILS - STORM SEWER	10/13/2014	SIDOCK ARCHITECTS
C-806	DETAILS - SOIL EROSION & SEDIMENT CONTROL	10/13/2014	SIDOCK ARCHITECTS
LANDSCAPE			
L-210	SITE LANDSCAPE PLAN	10/13/2014	SIDOCK ARCHITECTS
L-801	DETAILS - LANDSCAPING	10/13/2014	SIDOCK ARCHITECTS
ARCHITECTURAL			
A-210	FLOOR PLANS	10/13/2014	SIDOCK ARCHITECTS
A-301	EXTERIOR ELEVATIONS	10/13/2014	SIDOCK ARCHITECTS

CIVIL PERMITS/APPROVALS REQUIRED	
PERMIT/APPROVAL	ISSUED BY
PRELIMINARY SITE PLAN APPROVAL	DEXTER TOWNSHIP
FINAL SITE PLAN APPROVAL	DEXTER TOWNSHIP
SPECIAL LAND USE	DEXTER TOWNSHIP
SOIL EROSION NPDES PART 91	CHELSEA AREA CONSTRUCTION AUTHORITY
WATER SUPPLY - WELL	WASHTENAW COUNTY DEPARTMENT OF PUBLIC HEALTH
SANITARY GRINDER PUMP AND LINES	MULTI-LAKES WATER AND SEWER AUTHORITY
DRIVE APPROACH IN RIGHT-OF-WAY	WASHTENAW COUNTY ROAD COMMISSION



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Key Plan:

Client:
DEXTER TOWNSHIP

Project:
**NEW FIRE
SUBSTATION NO. 2**

DEXTER, MICHIGAN 48130



Date	Issued For
05/23/14	PRELIMINARY SPA
05/29/14	INTERNAL REVIEW
07/02/14	PRELIMINARY SPA
07/08/14	WCRC PERMIT
08/20/14	REVISED PRELIMINARY SPA
08/20/14	FINAL SPA/FINAL ENG
09/02/14	BIDS
10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

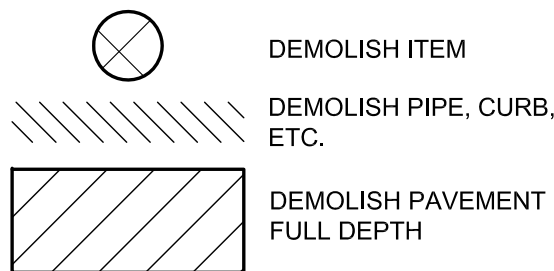
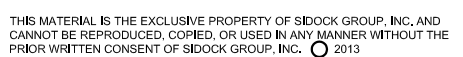
Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

Sheet Title:
**ABBREVIATIONS,
SYMBOLS &
SHEET INDEX**

Project Number: **14049**

Sheet Number: **G-002**

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Key Plan:

MAXIMUM LOT COVERAGE ALLOWED = 10% = 11,830 SQ. FT.
PROPOSED BUILDING = 118'x 86' (DRIP LINE TO DRIP LINE)
= 10,148 SQ. FT. = 8.68%

PROFESSIONAL OFFICE = 1 SPACE/ 300 SQ. FT. + 1 PER PERSON IN LARGEST SHIFT
3,444 SQ. FT. TOTAL AREA; 473 SQ. FT. OFFICE + 540 SQ.FT. CONFERENCE ROOM = 1,013 OCCUPIED
1013/300 = 3.38 = 4 SPACES + 3 SPACES LARGEST SHIFT = 7 SPACES REQUIRED.
(8) SPACES PROVIDED

PROFESSIONAL OFFICE = 1 SPACE/ 300 SQ. FT. + 1 PER PERSON IN LARGEST SHIFT.
9,000 SQ. FT. TOTAL AREA; 4,000 SQ. FT. OCCUPIED AREA
 $4,000/300 = 13.33 = 14$ SPACES + 2 SPACES FOR LARGEST SHIFT = 16 SPACES REQUIRED.
(16) SPACES PROVIDED

TO OUR KNOWLEDGE THE DAFD WILL HAVE NO HAZARDOUS MATERIALS ON SITE.

TAX I.D. #
04-16-200-005
ZONED-PL
(PUBLIC LANDS)
INTERNATIONAL
TRANSMISSION
CORRIDOR

GRAVEL PARKING:
GRAVEL TRAINING PAD AND OVERFLOW PARKING AREA.
AREA WILL NOT BE USED FOR PARKING UNTIL EITHER THE
ZONING ORDINANCE IS AMENDED TO ALLOW GRAVEL
PARKING AREAS OR THIS PROJECT OBTAINS SPECIAL
PLANNING COMMISSION APPROVAL TO DO SO.

Part of Land situated in the West 1/2 of Section 16, Town 1 South, Range 4 East, Dexter Township, Washtenaw County, Michigan described as:

Commencing at the West 1/4 corner of said Section 16; thence S 01°26'56" W 439.27 feet; thence N 87°58'30" E 1237.54 feet to the Point of Beginning; thence N 00°39'02" E 259.0 feet; thence N 88°01'58" E 287.93 feet; thence N 00°40'21" E 187.0 feet; thence S 88°02'59" E 104.04 feet; thence S 00°40'21" W 436.0 feet; thence S 87°58'30" W 428.0 feet to the Point of Beginning. Subject to an Ingress-Egress Easement as shown on EXHIBIT "B".

Contains 136,162 square feet or 3.13 acres (GROSS), 122,038 square feet or 2.80 acres (NET) of land, more or less. Subject to all easements and restrictions of record, if any.

SIGNAGE:
FIRE STATION SIGNAGE ALONG NORTH TERRITORIAL WILL NOT BE
UPGRADED TO FLASHING SERVICE CALL ACTIVATED SIGNAGE AT
THIS TIME. HOWEVER, THE DAFD AND DEXTER TOWNSHIP MAY
ELECT TO PERFORM THIS UPGRADE AT A LATER DATE.

NAMES AND ADDRESS FOR ALL PROPERTY OWNERS WITHIN THE MLWSA COMPLEX WILL BE CLEARLY DISPLAYED ON THE EXISTING FRONT ENTRY SIGN. ADDITIONALLY, EACH OWNER WILL HAVE AN ADDRESS CLEARLY READABLE ON THEIR FACILITIES.

Project:
NEW FIRE
SUBSTATION NO. 2

DEXTER, MICHIGAN 48130



Date	Issued For
05/23/14	SITE PLAN APPROVAL
05/29/14	INTERNAL REVIEW
07/02/14	PRELIMINARY SPA
07/08/14	WCRC PERMIT
08/20/14	REVISED PRELIMINARY SPA
08/20/14	FINAL SPA/FINAL ENG.
09/02/14	BIDS
10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

Drawn:	S. MANOS
Checked:	C. LEACH
Approved:	C. LEACH

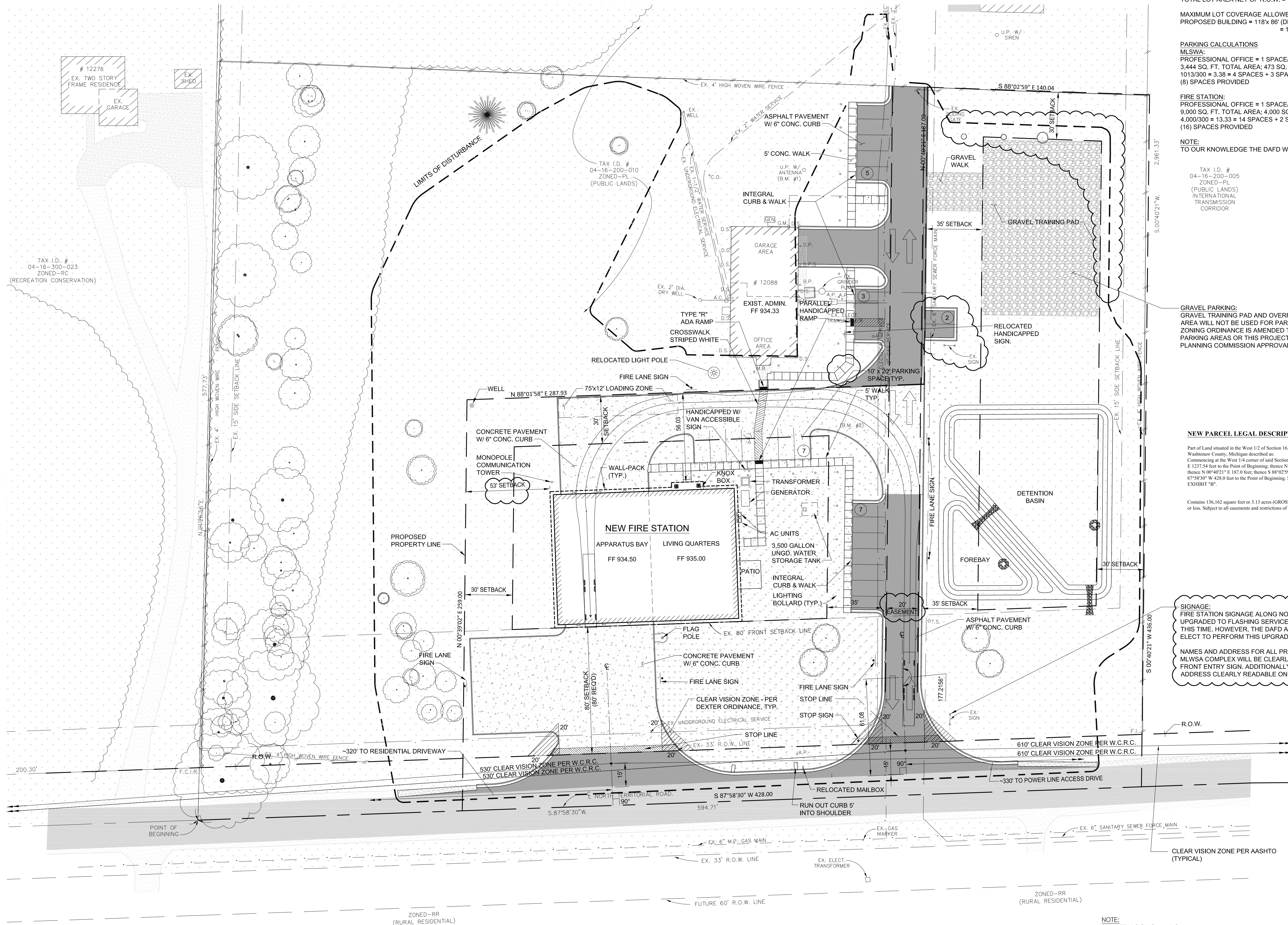
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GENERAL SITE PLAN

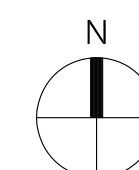
Project Number: 14049

Sheet Number: C-200

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NOTE:
SEE DETAILS ON C-801 & C-802



GENERAL SITE PLAN

SCALE: 1" = 30'



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Key Plan:

Client:
DEXTER TOWNSHIP

Project:
NEW FIRE
SUBSTATION NO. 2

DEXTER, MICHIGAN 48130

Seal:



Date	Issued For
05/23/14	PRELIMINARY SPA
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08/20/14	FINAL SPA/FINAL ENG.
09/02/14	BIDS
10/13/14	REV. FINAL/SPA FINAL ENG.
10/13/14	ADDENDUM #5

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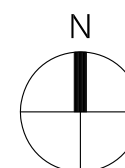
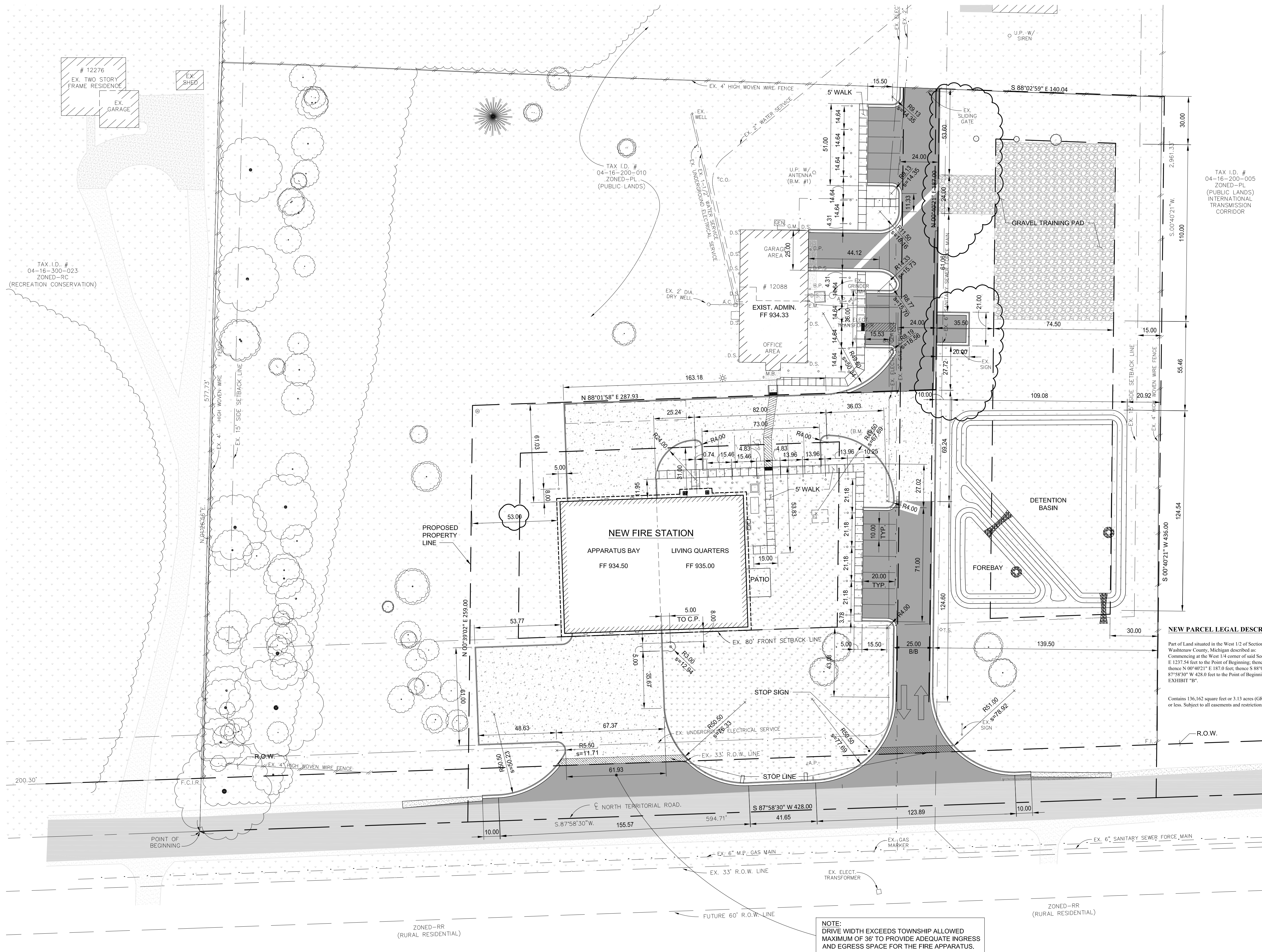
Sheet Title:

SITE DIMENSION
PLAN

Project Number: 14049

Sheet Number: C-210

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SITE DIMENSION PLAN

SCALE: 1" = 30'



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Key Plan:

Client:
DEXTER TOWNSHIP

Project:
NEW FIRE
SUBSTATION NO. 2

DEXTER, MICHIGAN 48130

Seal:



Date	Issued For
05/23/14	PRELIMINARY SPA
05/29/14	INTERNAL REVIEW
07/02/14	PRELIMINARY SPA
07/08/14	WCRC PERMIT
08/20/14	REVISED PRELIMINARY SPA
08/20/14	FINAL SPA/FINAL ENG.
09/02/14	BIDS
10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

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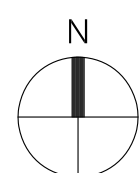
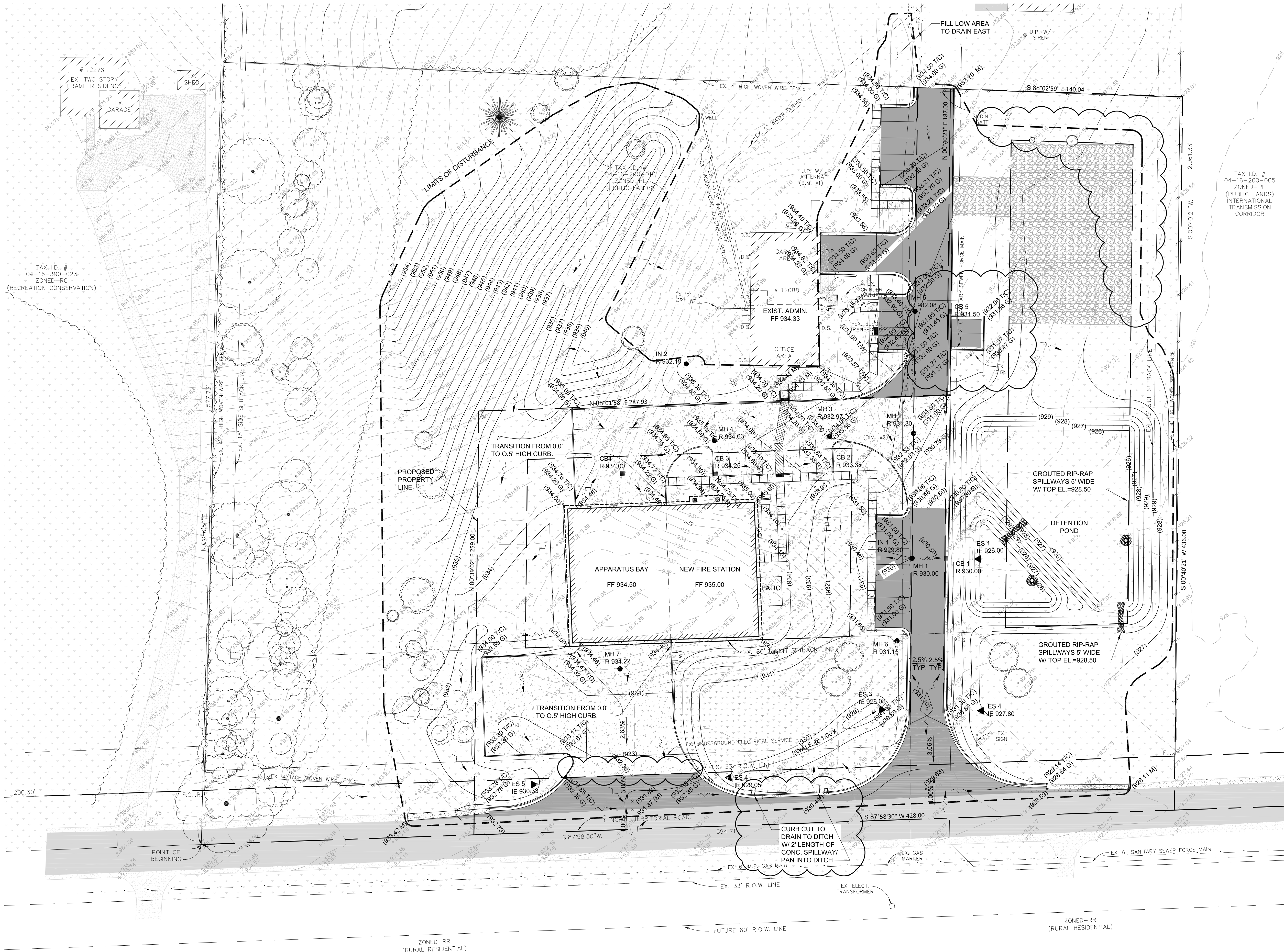
Sheet Title:

SITE GRADING PLAN

Project Number: 14049

Sheet Number: C-220

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SITE GRADING PLAN

SCALE: 1" = 30'



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Key Plan:

Client:
DEXTER TOWNSHIP

Project:
NEW FIRE
SUBSTATION NO. 2

DEXTER, MICHIGAN 48130

Seal:



Date	Issued For
07/02/14	PRELIMINARY SPA
07/08/14	WCRC PERMIT
08/11/14	WELL REVIEW
08/12/14	WELL PERMIT
08/20/14	REVISED PRELIMINARY SPA
08/20/14	FINAL SPA/FINAL ENG.
09/02/14	BIDS
10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

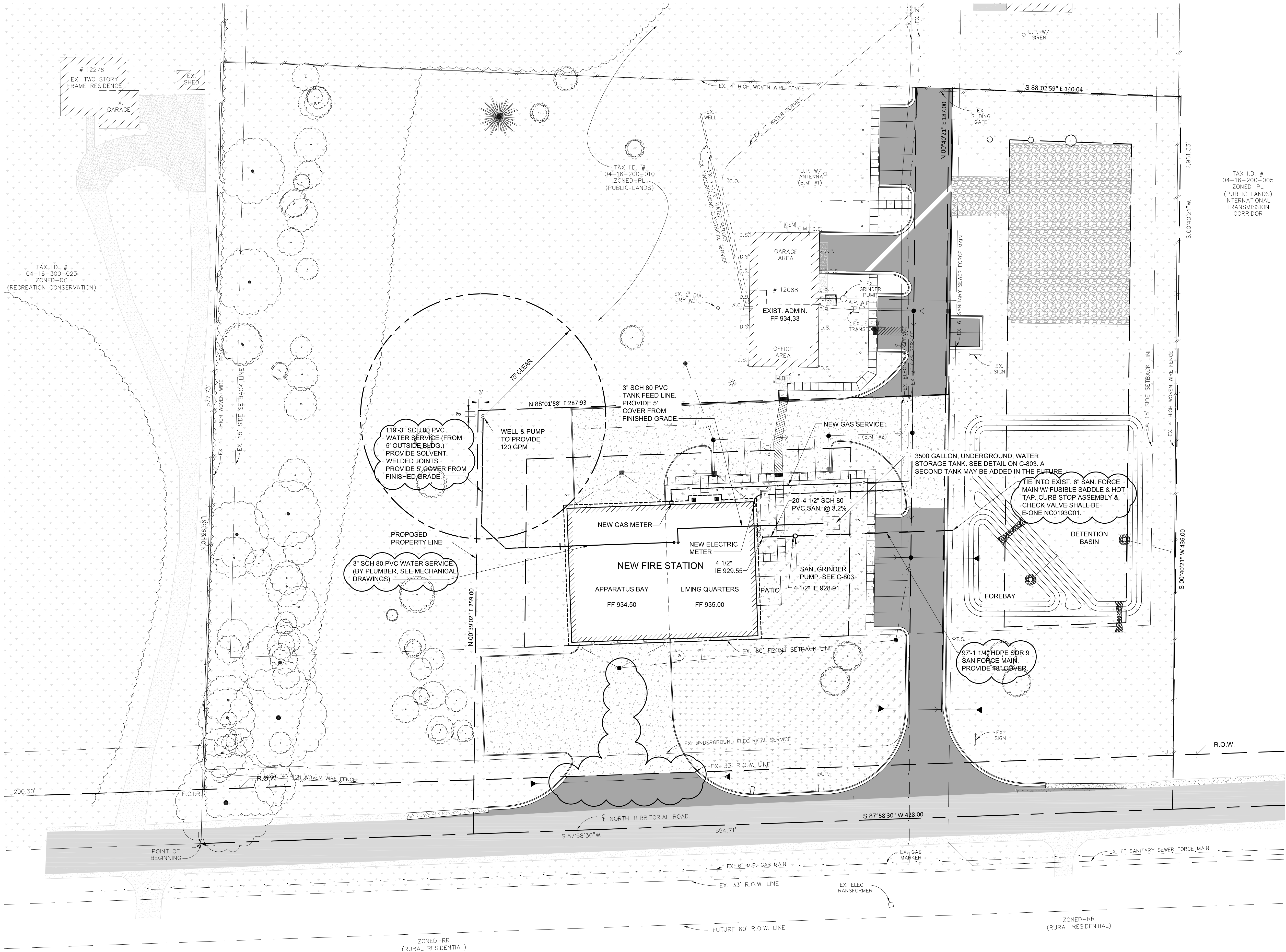
Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

Sheet Title:
SITE UTILITY PLAN

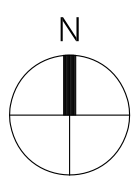
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NOTE:
SEE DETAIL ON C-803



SITE UTILITY PLAN

SCALE: 1" = 30'



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Key Plan:

Client:

DEXTER TOWNSHIP

Project:
NEW FIRE
SUBSTATION NO. 2

DEXTER, MICHIGAN 48130

Seal:



Date	Issued For
05/23/14	PRELIMINARY SPA
05/29/14	INTERNAL REVIEW
07/02/14	PRELIMINARY SPA
07/08/14	WCRC PERMIT
08/20/14	REVISED PRELIMINARY SPA
08/20/14	FINAL SPA/FINAL ENG
09/02/14	BIDS
10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

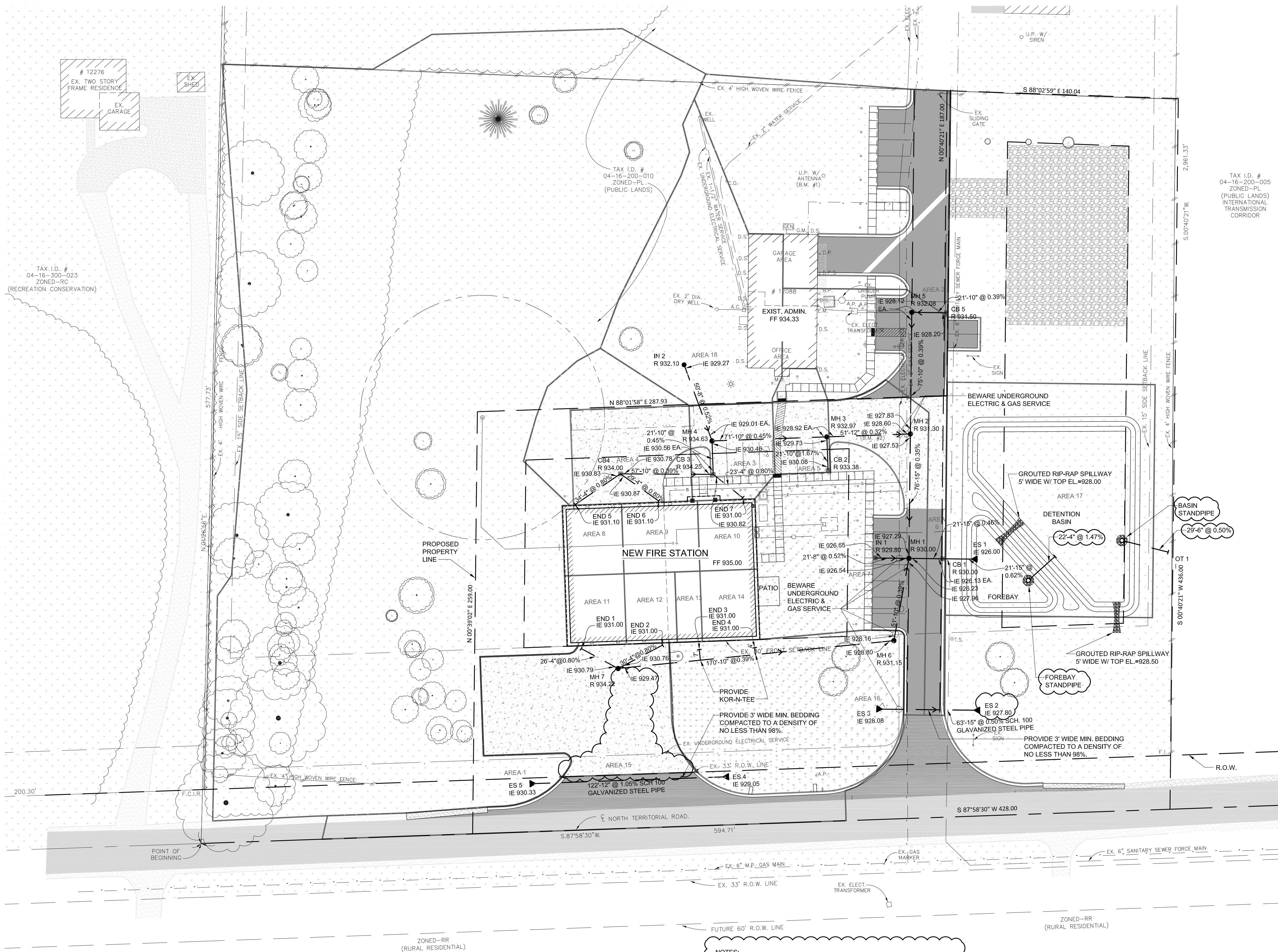
Sheet Title:

SITE STORM WATER
MANAGEMENT PLAN

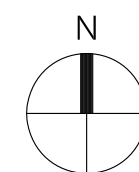
Project Number: 14049

Sheet Number: C-240

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- NOTES:
- ALL 12" & LARGER STORM SEWER SHALL BE C-76 R.C.P. CLASS V U.N.O. 8" & 10" PIPE SHALL BE C-76 R.C.P. WALL B.
 - PLACE COMPACTED SAND BACKFILL ABOVE ALL STORM SEWER IN PAVED AREAS.
 - ALL 4" STORM SEWERS BUILDING LEADS SHALL BE SCH. 40 PVC @ 0.80% MIN. U.N.O.
 - END SECTIONS SHALL BE 6' LENGTH C76 REINFORCED CONCRETE.
 - CURB CATCH BASINS & INLETS SHALL HAVE EJIW 7450 FRAME W/ TYPE M1 LID.
 - CB3 SHALL HAVE EJIW 5000 FRAME W/ TYPE M1 LID.
 - ALL STORM MANHOLES SHALL HAVE EJIW 1130 FRAME W/ SOLID LID.
 - TRENCH DRAIN SHALL HAVE EJIW 6951 FRAME W/ TYPE M2 LID.
 - SEE SHEETS C-803, C-804, & C-805 FOR DETAILS.
 - USE LOW COVER MANHOLES AS APPLICABLE.



SITE STORM WATER MANAGEMENT PLAN

SCALE: 1" = 30'



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Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

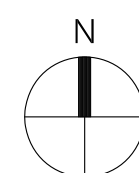
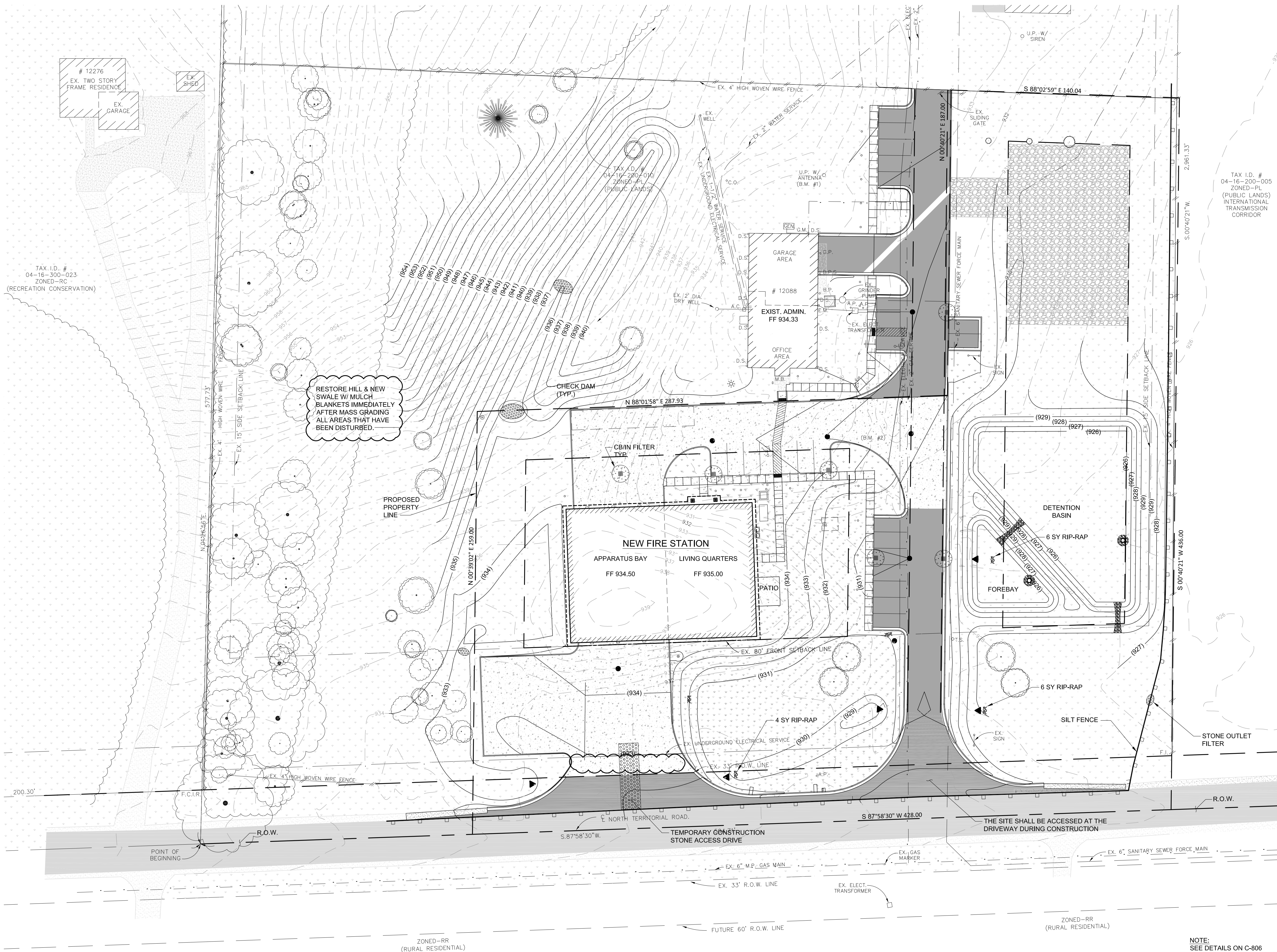
Sheet Title:

SOIL EROSION AND
SEDIMENT
CONTROL PLAN

Project Number: 14049

Sheet Number: C-250

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SOIL EROSION AND SEDIMENT CONTROL PLAN

SCALE: 1" = 30'

Key Plan:

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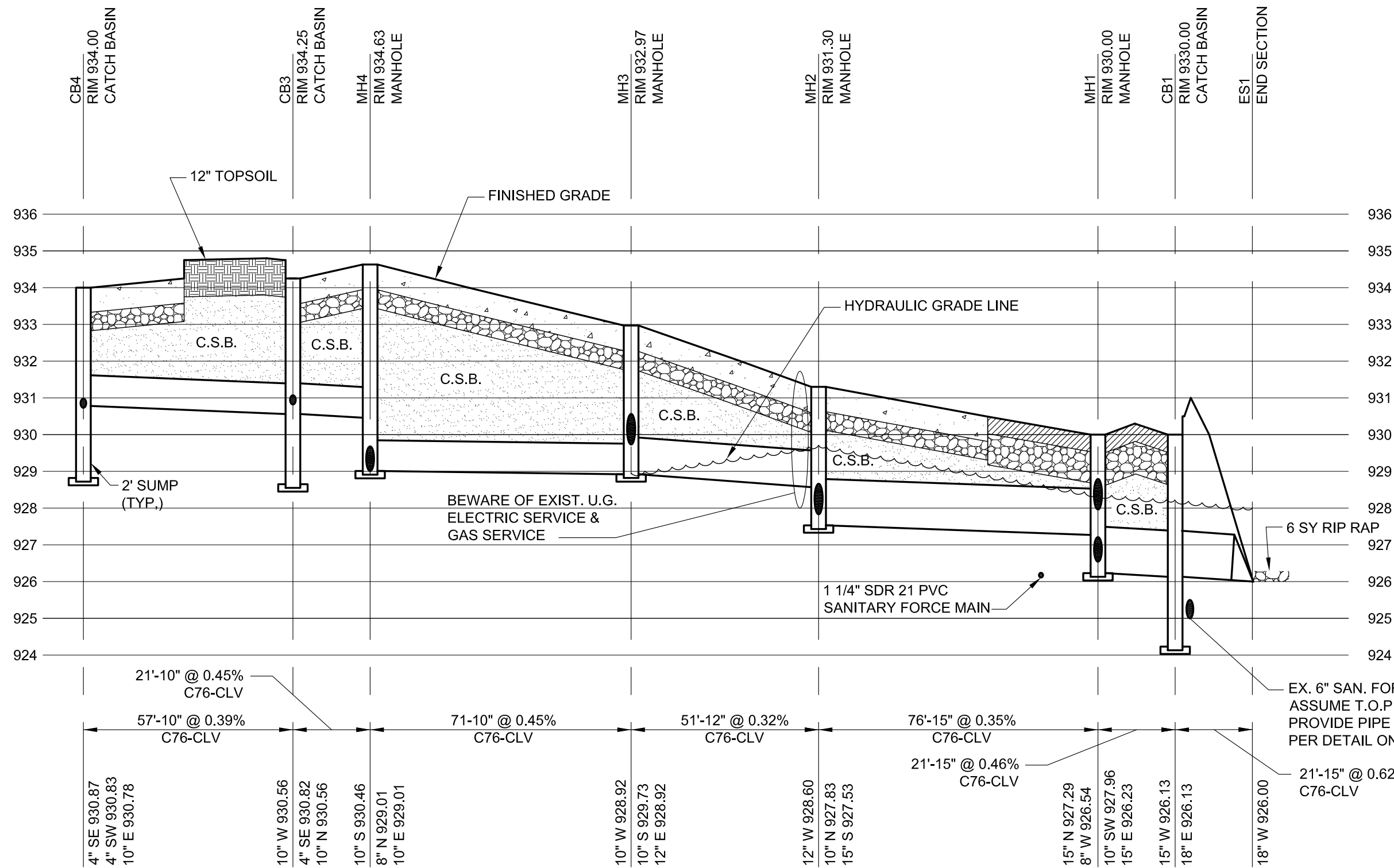
Drawn:	C. MEISEL
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Approved:	C. LEACH

Sheet Title:
**STORM SEWER
PROFILES**

Project Number: 14049

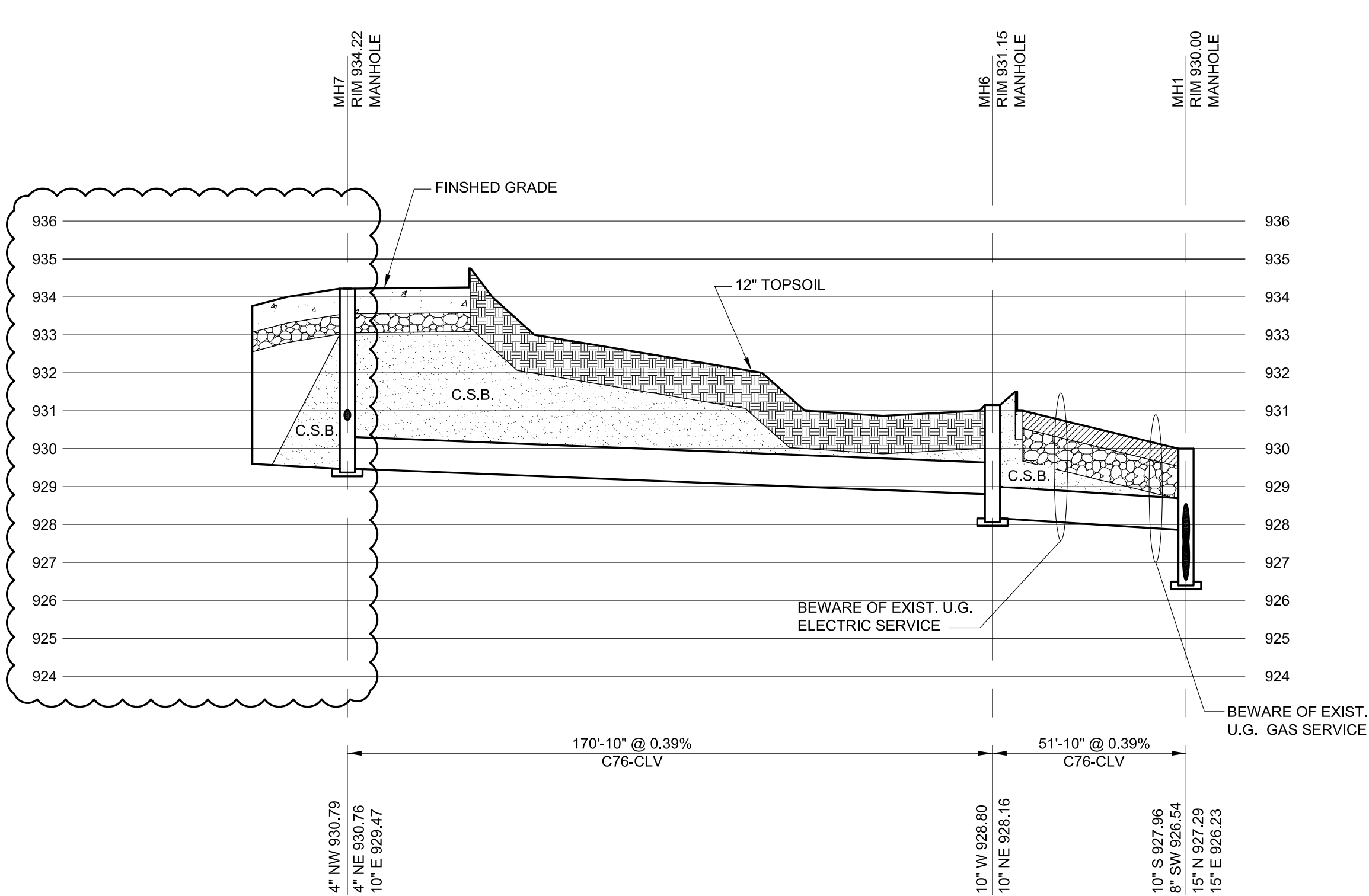
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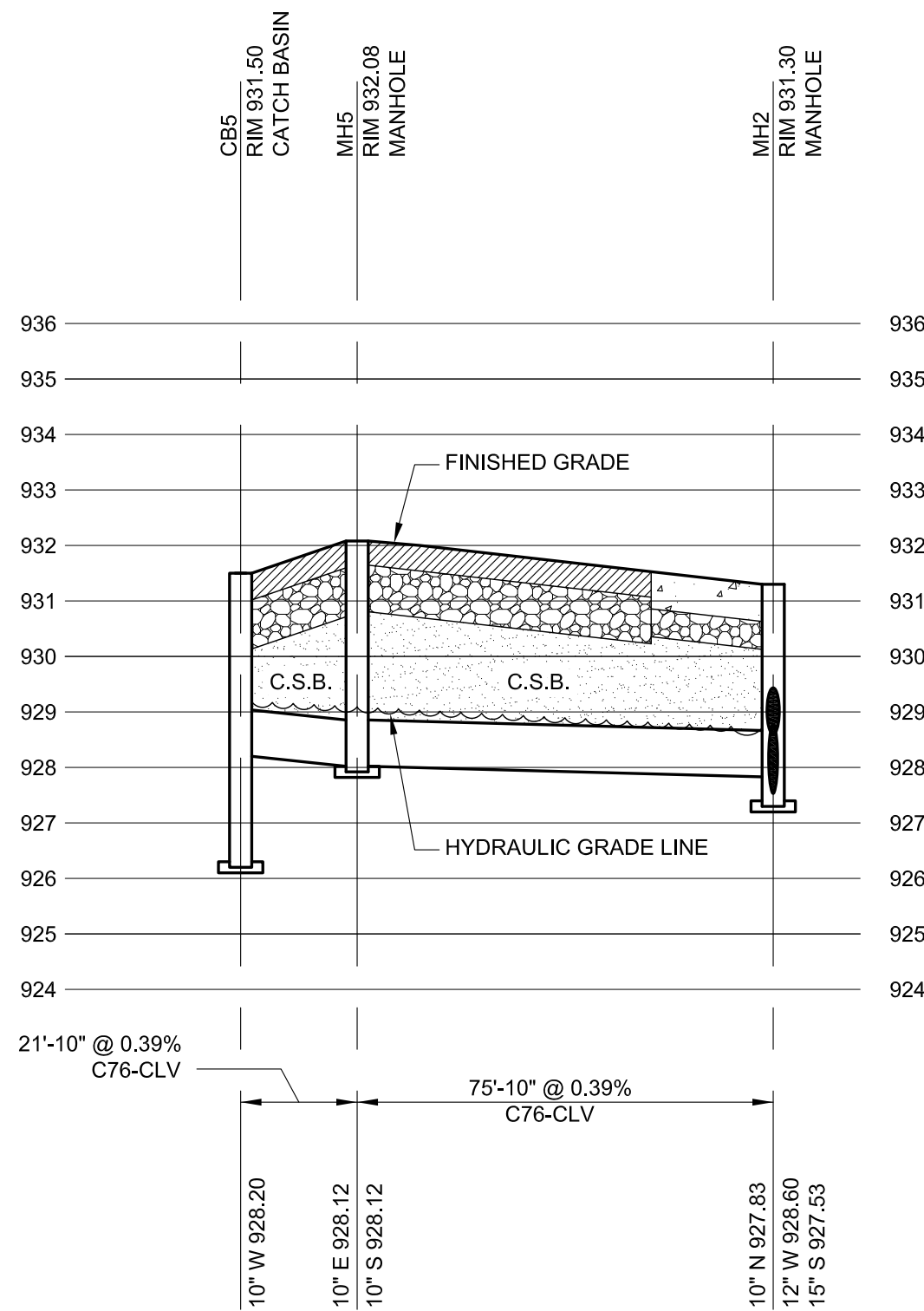
STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



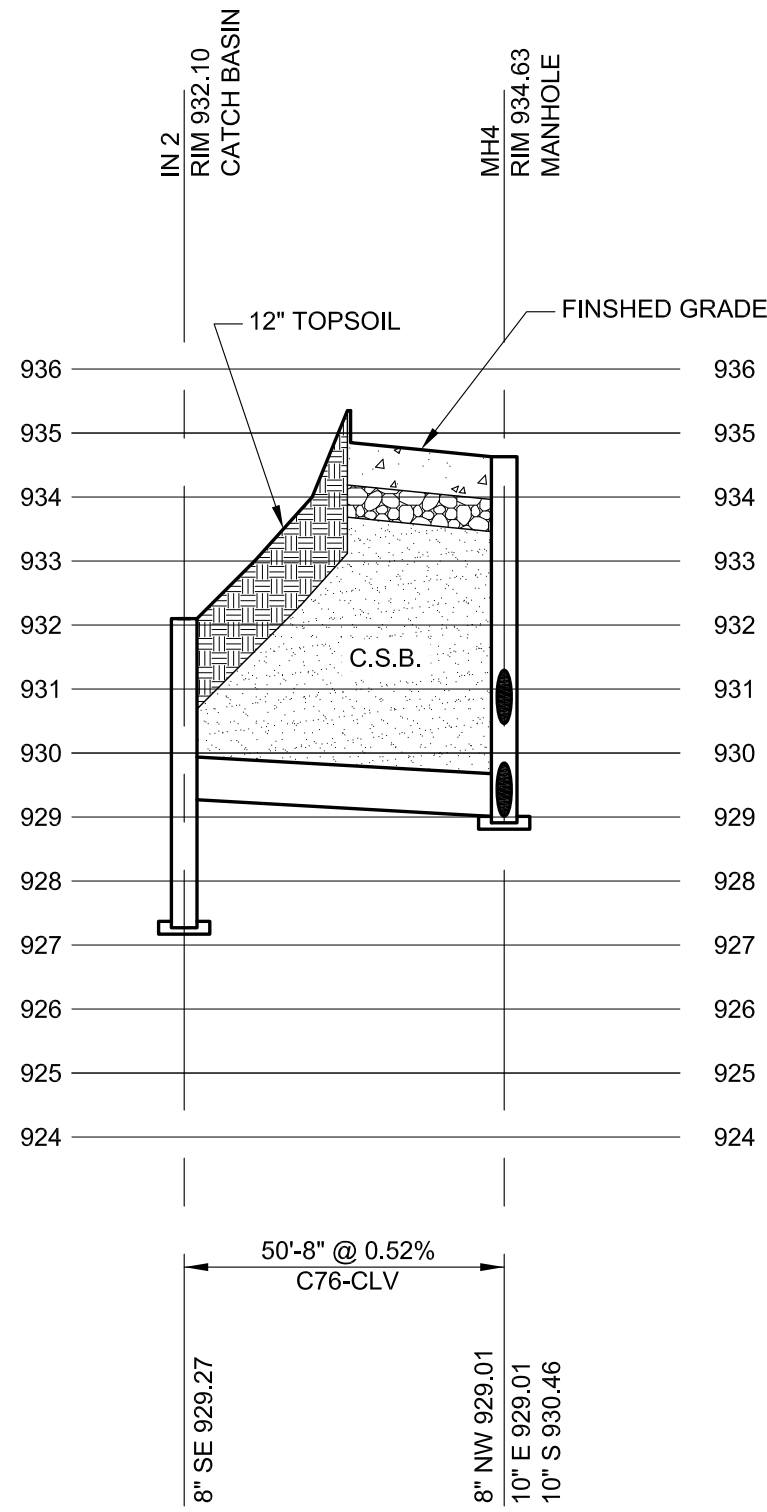
STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



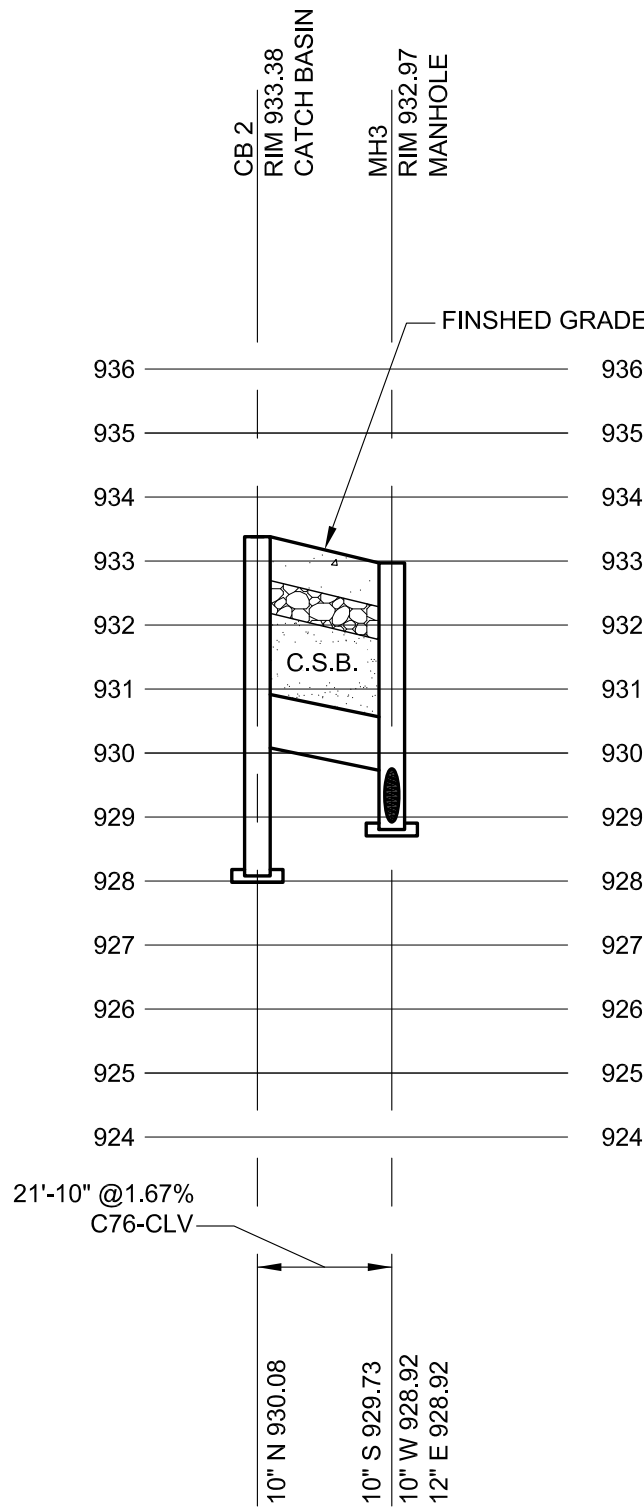
STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



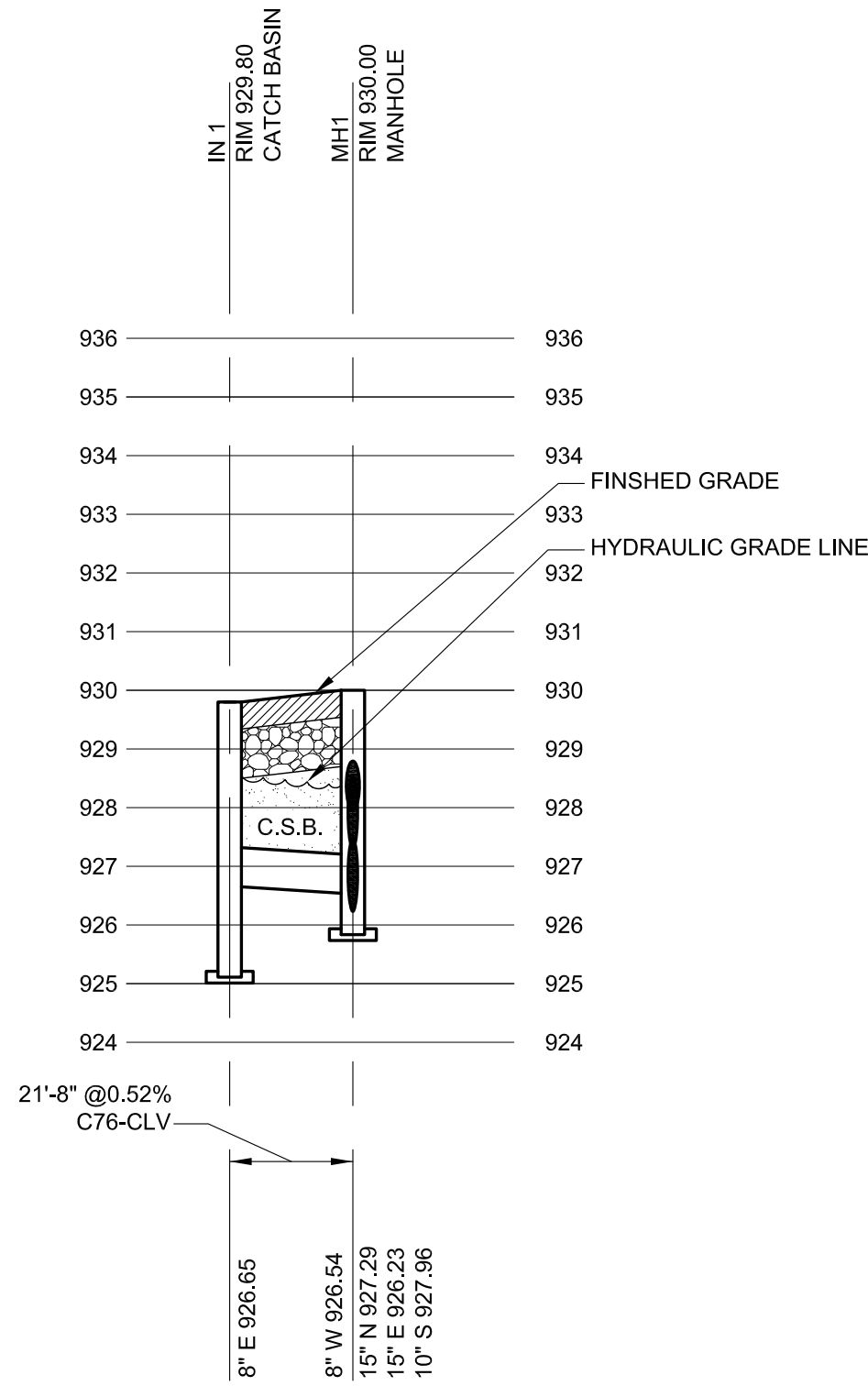
STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



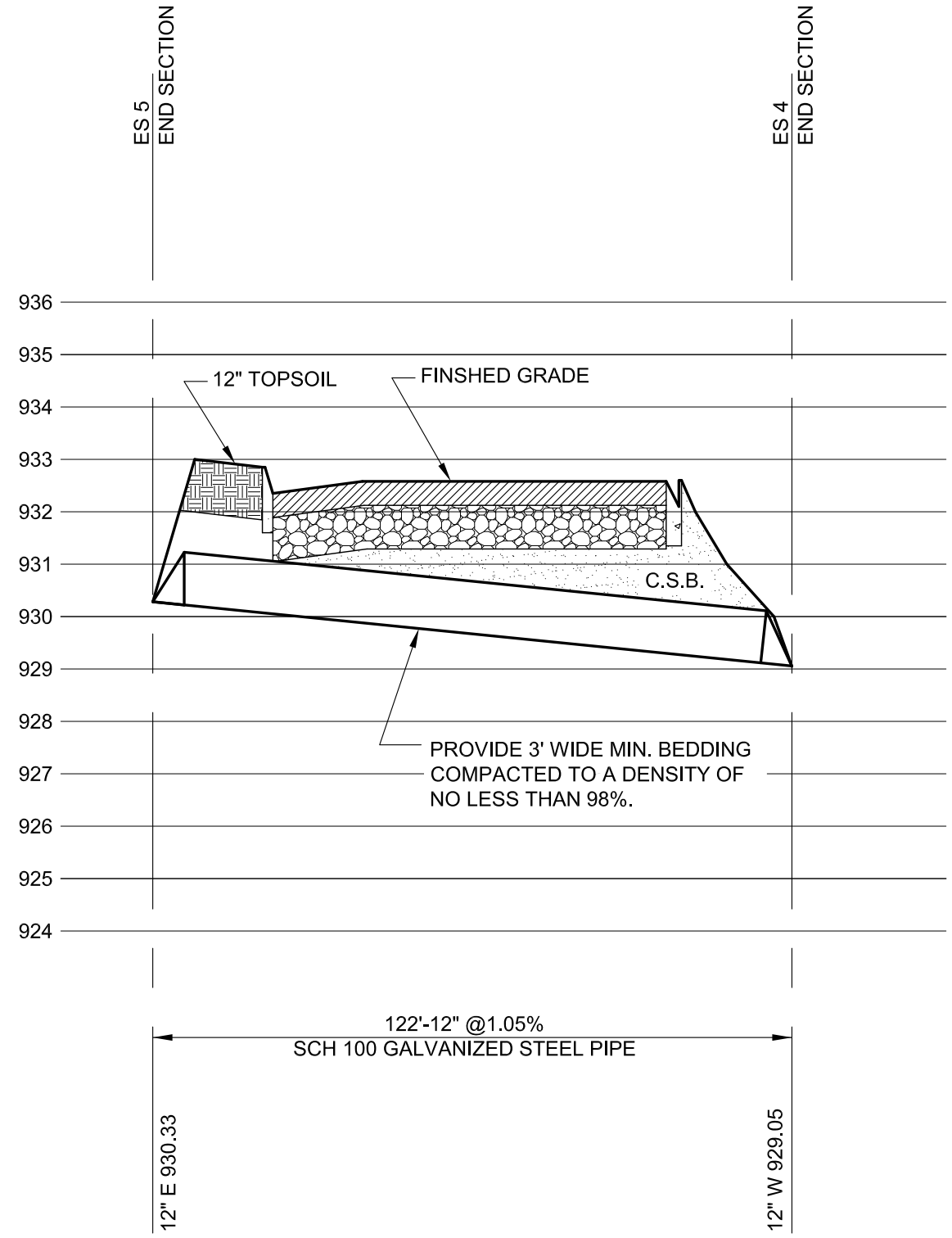
STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



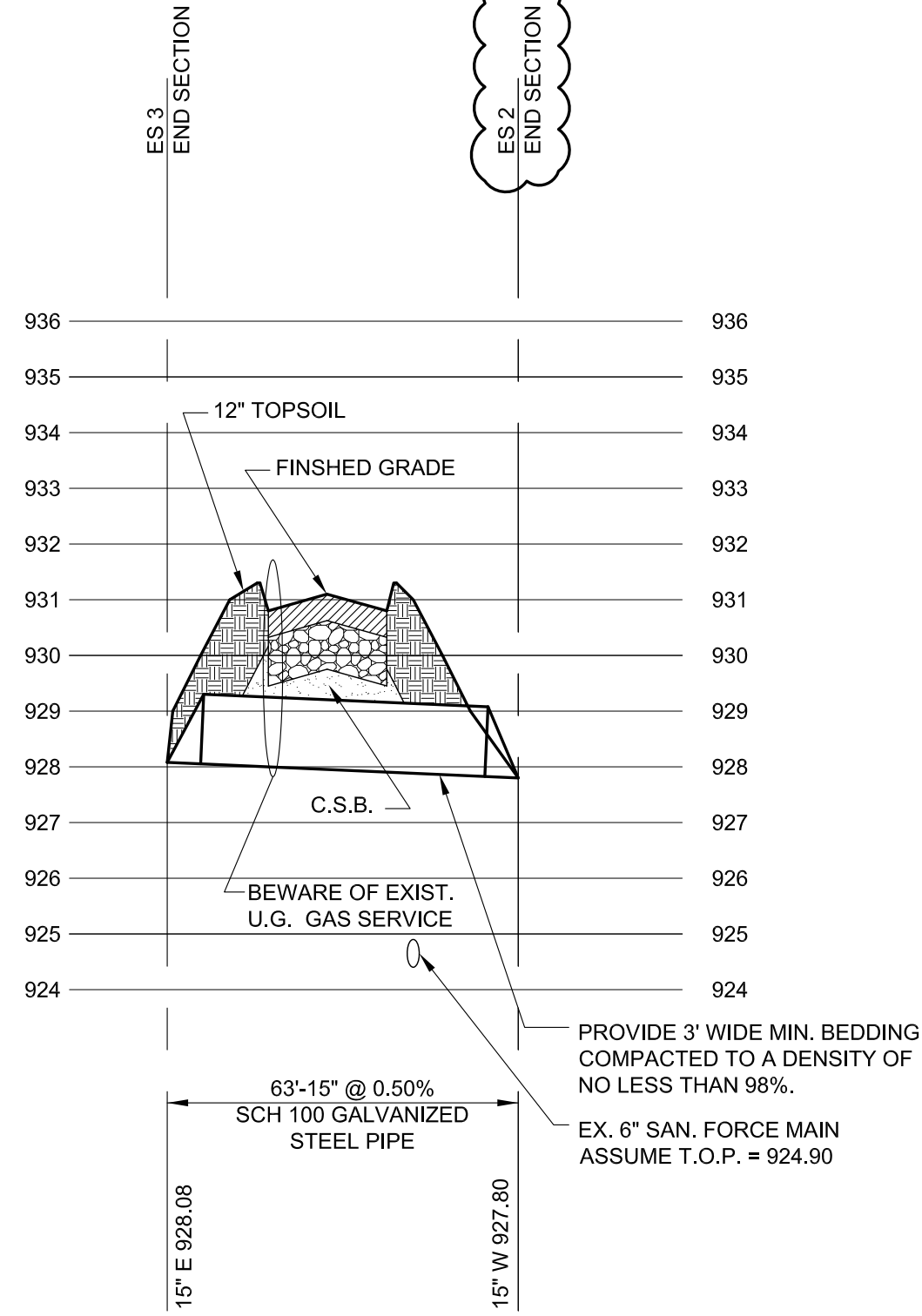
STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.



STORM SEWER PROFILE

SCALE:1"=3' VERT.
SCALE:1"=30' HORIZ.

NOTE:
1. ALL MANHOLES ARE 4'Ø UNLESS NOTED OTHERWISE.
2. PROVIDE COMPACTED SAND BACKFILL (C.S.B.) BELOW ALL PAVEMENT AND AS INDICATED.



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10/13/14 ADDENDUM #5

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Sheet Title:
CALCULATIONS

Project Number: 14049

Sheet Number: C-400

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DETENTION BASIN CALCULATIONS

AREA = 2.29 ACRES
WEIGHTED C = 0.67

RATIONAL METHOD

Q=CIA

$$I = \frac{151.6}{15 \times 19.9} = 4.35$$

$$Q_{10} = (0.67)(4.35)(2.29) = 6.67 \text{ CFS} \quad 10\text{-YEAR EVENT}$$

100-YEAR VOLUME

$$Q_{100} = (0.15 \text{ CFS/Ac})(2.29 \text{ Ac}) = 0.3435 \text{ CFS}$$

$$Q_{100} = \frac{Q_{10}}{AC} = \frac{6.67 \text{ CFS}}{2.29 \text{ Ac}} = 0.224 \text{ CFS/Ac}$$

$$T = -25 + \sqrt{(10,312.5/Q_{100})} = -25 + \sqrt{(10,312.5/0.224)} = 189.52 \text{ Min}$$

$$V_{100} = \frac{16,500T - 40Q_{100}T}{T+25} = \frac{16,500(189.52) - (40)(0.224)(189.52)}{189.52+25} = 12,879.00 \text{ CF/Ac}$$

$$V_{100} = V_{100}AC = (12,879.00 \text{ CF/Ac})(2.29 \text{ Ac})(0.67) = 19,780 \text{ CF REQ'D}$$

BANKFULL FLOOD

$$V_{BF} = (2.25)^{1/3}[(1/12)^{1/3}(43,560 \text{ SF/1 Ac})AC] = 8,167.5AC = 8,167.5(2.29)(0.67) = 12,531 \text{ REQ'D}$$

FIRST FLUSH

$$V_{FF} = (0.5)^{1/3}[(1/12)^{1/3}(43,560 \text{ SF/1 Ac})AC] = 1,815AC = 1,815(2.29)(0.67) = 2,785 \text{ CF REQ'D}$$

STORAGE PROVIDED

FOREBAY VOLUME			
ELEV.	AREA	INC. VOL.	Σ VOL.
(FT ²)	(FT ²)	(FT ³)	(FT ³)
926.00	1,182	1,428	1,428
927.00	1,673	1,947	3,374
928.00	2,220		

DETENTION BASIN VOLUME			
ELEV.	AREA	INC. VOL.	Σ VOL.
(FT ²)	(FT ²)	(FT ³)	(FT ³)
926.00	6,375	7,104	7,104
927.00	7,633	8,190	15,294
928.00	8,747		

$$\text{TOTAL STORAGE} = \text{FOREBAY} + \text{MAIN BAY} = 3,375 + 15,294 = 18,668 \text{ FT}^3$$

STORAGE ELEVATIONS

$$\text{FIRST FLUSH} = 928.00 - 927.00 = 2\text{ft} - 927.00 \rightarrow Z_{FF} = 927.70$$
$$3,374 - 1,428 \quad 2,785 - 1,428$$

$$\text{VOLUME REMAINING IN FOREBAY} = V_{100} - V_{FF} = 3,374 - 2,785 = 589 \text{ FT}^3$$

$$\text{MAIN BAY} + \text{VOLUME REMAINING IN FOREBAY} = 15,294 + 589 = 15,883 \text{ FT}^3$$

$$\text{BANKFULL} = 928.00 - 927.00 = 2\text{ft} - 927.00 \rightarrow Z_{BF} = 927.66$$
$$15,294 - 7,104 \quad 12,531 - 7,104$$

FOREBAY STANDPIPE OUTLET CONTROL STRUCTURE

$$Q_{10} = V_{10}/T_{10} = 2,785/(24 \text{ HR} \times 3600 \text{ SEC/1 HR}) = 0.032 \text{ CFS}$$

$$h_{100} = (2/3)(E_{100} - E_{1000}) = (2/3)(927.70 - 926.00) = 1.33 \text{ FT}$$

ORIFICE FORMULA ASSUMING 4" (0.33') PIPE

$$Q_{10} = 0.62(A_o)(2gh)^{1/2}$$

$$h = (2/3)(h_{100} - h_{1000}) = (2/3)(927.70 - 926.00) = 1.13 \text{ FT}$$

$$A_o = \frac{Q_{10}}{0.62(2gh)^{1/2}} = \frac{0.032}{(0.62)[(2)(32.2)(1.13)]^{1/2}} = 0.00604 \text{ SF}$$

$$\text{DIAMETER ORIFICE } (D_o) = (4A_o/n)^{1/2} = [(4)(0.00604)/\pi]^{1/2} = 0.0877 \text{ FT} \approx 1.05 \text{ IN}$$

USE 1" RESTRICTION IN 4" OUTLET PIPE

$$A_{10} = \pi r^2 = \pi(2')^2(1^2 \text{ FT}^2/12^2 \text{ IN}^2) = 0.0873 \text{ FT}^2$$

$$A_{10} = \pi r^2 = \pi(0.5')^2(1^2 \text{ FT}^2/12^2 \text{ IN}^2) = 0.00545 \text{ FT}^2$$

$$Q_{100} = 0.62A_{10}V_{64.4H} = (0.62)(0.00545)\sqrt{(64.4 \times 1.33)} = 0.0313 \text{ CFS}$$

$$T_{100} = V_{100} / (Q_{100} \times 3,600) = 2,785 / (0.0313)(3,600) = 24.7 \text{ Hrs} > 24 \text{ Hrs}$$

FOREBAY RISER OUTLET PIPE SLOPE

$$S = [nQ/(1.489A_{10}R^{2/3})]^2 = [(0.012)/(0.0313)/(1.486)(0.0873)(0.083^{2/3})]^2 = 0.0147 = 1.47\%$$

$$n = 0.012$$

$$Q_{100} = 0.0313$$

$$R = 0.33/4 = 0.083$$

$$A_{10} = 0.0873 \text{ FT}^2$$

SPILLWAY DESIGN

$$Q_{101} = 4.96 \text{ CFS}$$

$$Q = C_B H^{3/2} \rightarrow B = Q/C_B^{2/3} = 4.96/(3.4)^{2/3} = 4.13 \text{ FT} \rightarrow \text{USE } 5 \text{ FT WIER LENGTH @ } 0.50 \text{ DEPTH}$$

BANKFULL FLOOD

$$Q_{100} = \frac{V_{100}}{144,000} = \frac{12,531}{144,000} = 0.0870 \text{ CFS}$$

$$h = (2/3)(h_{100} - h_{1000}) = (2/3)(927.66 - 926.00) = 1.11 \text{ FT}$$

$$A_o = \frac{Q_{100}}{0.62(2gh)^{1/2}} = \frac{0.0870}{(0.62)[(2)(32.2)(1.11)]^{1/2}} = 0.0166 \text{ SF}$$

$$1" \text{ } \phi \text{ HOLE} = 0.00545 \text{ SF}$$

$$\# = 0.0166 \text{ SF}/0.00545 \text{ SF} = 3.05 \rightarrow \text{USE } (3) \text{ } 1" \text{ } \phi \text{ HOLES @ ELEV} = 926.00$$

ORIFICE FORMULA ASSUMING 6" (0.50') PIPE

$$A_o = \frac{Q_{100}}{0.62(2gh)^{1/2}} = \frac{0.0870}{(0.62)[(2)(32.2)(1.11)]^{1/2}} = 0.0655 \text{ SF}$$

$$D_o = (4A_o/n)^{1/2} = [(4)(0.0655)/\pi]^{1/2} = 0.289 \text{ FT} \approx 3.47 \text{ IN} \rightarrow \text{USE } 3 \text{ } 1/4" \text{ RESTRICTOR IN } 6" \text{ OUTLET PIPE}$$

RISER OUTLET PIPE SLOPE

$$A_{100} = \pi r^2 = \pi(1.625')^2(1^2 \text{ FT}^2/12^2 \text{ IN}^2) = 0.0576 \text{ FT}^2$$

$$Q_{100} = 0.62A_{100}V_{64.4H} = (0.62)(0.0576)\sqrt{(64.4 \times 1.33)} = 0.331 < 0.3435 \text{ CFS}$$

$$S = [nQ/(1.489A_{10}R^{2/3})]^2 = [(0.012)/(0.331)/(1.486)(0.196)(0.125^{2/3})]^2 = 0.0030 = 0.30\%$$

$$\text{USE } 0.50\% \text{ FOR } 2.6 \text{ FT/S VELOCITY TO PREVENT SEDIMENTATION}$$

$$n = 0.012$$

$$Q_{100} = 0.331$$

$$R = 0.5/4 = 0.125$$

$$A_{10} = \pi r^2 = \pi(3')^2(1^2 \text{ FT}^2/12^2 \text{ IN}^2) = 0.196 \text{ FT}^2$$

FLOOD CONTROL VOLUME PROVIDED

$$\begin{aligned} V_{\text{FOREBAY}} &= 3,374 \text{ CF} \\ V_{\text{MAIN}} &= 15,294 \text{ CF} \\ V_{\text{TOTAL}} &= 18,668 \text{ CF} \\ V_{\text{100}} &= 19,780 \text{ CF} \\ V_{\text{SHORT}} &= 1,092 \text{ CF} \end{aligned} \quad @ \text{ ELEV} = 928.00$$

DUE TO SITE CONSTRAINTS THE PROVIDED STORAGE IS 1,092 CUBIC FEET (5.5%) LESS THAN THE 100 YEAR STORM AS CALCULATED BY THE WASHTENAW COUNTY WATER RESOURCE COMMISSIONER. THIS STORMWATER SYSTEM DOES NOT OUTLET TO A COUNTY DRAIN. WASHTENAW COUNTY DRAIN CALCULATION PROVIDED ABOVE ONLY FOR REFERENCE. BY OBSERVATION THE BASIN WILL HOLD MUCH MORE THAN THE 50 YEAR STORM, THUS STATISTICALLY THE BASIN HAS THE PROBABILITY OF OVERFLOWING LESS THAN ONCE EVERY 50 YEARS.

PER DEXTER TOWNSHIP ZONING ORDINANCE SECTION 24.06 (B)(1) ONE INCH OF RAIN IS REQUIRED TO BE TREATED FROM ALL IMPERVIOUS SURFACES.

TOTAL AREA BOTH IMPERVIOUS AND PERVIOUS = 2.29 ACRES
(PERVIOUS AREA INCLUDED TO BE CONSERVATIVE)

$$(1") (2.29 \text{ ACRES})(1 \text{ FT}/12 \text{ IN})(43,560 \text{ SF}/1 \text{ ACRE}) = 8,313 \text{ FT}^3 \text{ REQUIRED PER DEXTER ZONING}$$
$$18,668 \text{ FT}^3 \text{ PROVIDED } (2.25 \times \text{MORE THAN REQ'D})$$

TRENCH DRAIN
REMOVED FROM SCOPE

STORM SEWER DESIGN																			
JOB No.: 13314 NAME : Dexter F.D. CLIENT : Dexter										PATH : N:\2014eng\14049 Dexter Twp New Fire Substation Facility\04 Civil and Survey\Calculations DATE : 10/10/2014 TIME : 09:44 AM									
STORM SEWER DESIGN										10 YEAR STORM									
LOCATION: Dexter, MI										10/10/14									
STARTING TIME= 15.00										13314.00									
MANNING'S "n"= 0.013										Dexter F.D.									
STORM "T" = 151.8										Dexter									
T+19.90																			
Upst Str. #	Dnst Str. #	Pipe Len (L) Ft	Area #	Added Area			Time of Conc. (T) Min	Intensity (I) In/Hr	(ACI) (Q) Cfs	PIPE DIA (D) Inches	PIPE SLP (S) %	V Full (V) Fps	FI Time Min	INVERT ELEV. Upst #	Dnst #	Q (capacity) Cfs	RIM or GRADE	STR. NO.	HGL
END 5	CB 4	34	8	0.04	0.95	0.034	0.03	15.00	4.35	0.15	4	0.80	2.5	0.22	931.10	930.83	0.22	934.50	END 5
END 6	CB 4	29	9	0.05	0.95	0.044	0.04	15.00	4.35	0.19	4	0.80	2.5	0.19	931.10	930.87	0.22	934.50	END 6
CB 4	CB 3	57	4	0.17	0.60	0.102	0.18	15.22	4.32	0.78	10	0.39	2.5	0.38	930.78	930.58	1.37	934.00	CB 4
IN 2	MH 4	50	18	0.27	0.29	0.079	0.08	15.00	4.35	0.34	8	0.52	2.5	0.33	929.27	929.01	0.87	932.10	IN 2
END 7	CB 3	23	10	0.03	0.95	0.033	0.03	15.00	4.35	0.14	4	0.80	2.5	0.15	931.00	930.82	0.22	934.50	END 7
CB 3	MH 4	21	3	0.07	0.55	0.037	0.25	15.60	4.28	1.07	10	0.45	2.7	0.13	929.01	928.92	1.47	934.25	CB 3
MH 4	MH 3	71	0	0.00	0.00	0.000	0.33	15.73	4.26	1.40	10	0.45	2.7	0.44	928.92	928.60	1.47	934.63	MH 4
CB 2	MH 3	21	5	0.05	0.83	0.039	0.04	15.00	4.35	0.17	10	1.67	5.2	0.07	930.08	929.73	2.84	933.38	CB 2
MH 3	MH 2	51	0	0.00	0.00	0.000	0.37	16.17	4.21	1.55	12	0.32	2.6	0.33	928.92	928.75	2.02	932.97	MH 3
CB 5	MH 5	21	2	0.38	0.51	0.187	0.20	15.00	4.35	0.86	10	0.39	2.5	0.14	928.20	928.12	1.37	931.50	CB 5
MH 5	MH 2	75	0	0.00	0.00	0.000	0.20	15.14	4.33	0.86	10	0.39	2.5	0.50	928.12	927.83	1.37	932.08	MH 5
MH 2	MH 1	78	0	0.00	0.00	0.000	0.57	16.50	4.17	2.36	15	0.35	3.1	0.41	927.83	927.26	3.63	931.30	MH 2
END 1	MH 7	28	11	0.04	0.95	0.034	0.03	15.00	4.35	0.15	4	0.80	2.5	0.17	931.00	930.79	0.22	934.50	END 1
END 2	MH 7	30	12	0.03	0.95	0.029	0.03	15.00	4.35	0.13	4	0.80	2.5	0.20	931.00	930.78	0.22	934.50	END 2
END 3	WYE	15	13	0.02	0.95	0.015	0.01	15.00	4.35	0.06	4	0.80	2.5	0.10	931.00	930.88	0.22	934.50	END 3
END 4	WYE	10	14	0.03	0.95	0.033	0.03	15.00	4.35	0.14	4	0.80	2.5	0.07	931.00	930.92	0.22	934.50	END 4
TD 1	MH 7	64	15	0.19	0.95	0.185	0.19	15.00	4.35	0.81	8	0.52	2.5	0.43	929.80	929.47	0.87	932.30	TD 1
MH 7	MH 6	170	0	0.00	0.00	0.000	0.30	15.43	4.30	1.27	10	0.39	2.5	1.13	929.47	928.80	1.37	934.22	MH 7
MH 6	MH 1	51	0	0.00	0.00	0.000	0.30	16.55	4.16	1.23	10	0.39	2.5	0.34	928.16	927.96	1.37	931.15	MH 6
IN 1	MH 1	21	7	0.31	0.63	0.199	0.20	15.00	4.35	0.87	8	0.52	2.5	0.14	926.65	926.54	0.87	929.80	IN 1
MH 1	CB 1	21	0	0.00	0.00	0.000	1.06	16.90	4.12	4.38	15	0.46	3.6	0.10	926.23	926.13	4.39	930.00	MH 1
CB 1	ES 1	21	6	0.19	0.76	0.144	1.21	17.00	4.11	4.96	15	0.62	4.2	0.06	926.13	926.00	5.10	930.00	CB 1
ES 5	ES 4	122	1	2.36	0.35	0.827	0.83	15.00	4.35	3.60	12	1.05	4.7	0.44	930.33	929.05	3.66	932.00	ES 5
ES 3	ES 4	63	16	0.45	0.47	0.213	1.04	15.44	4.30	4.47	15	0.50	3.7	0.28	928.12	927.80	4.58	927.80	ES 3



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Key Plan:

Client:

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Project:

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DEXTER, MICHIGAN 48130

Seal:



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10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

Sheet Title:

DETAILS - PAVING

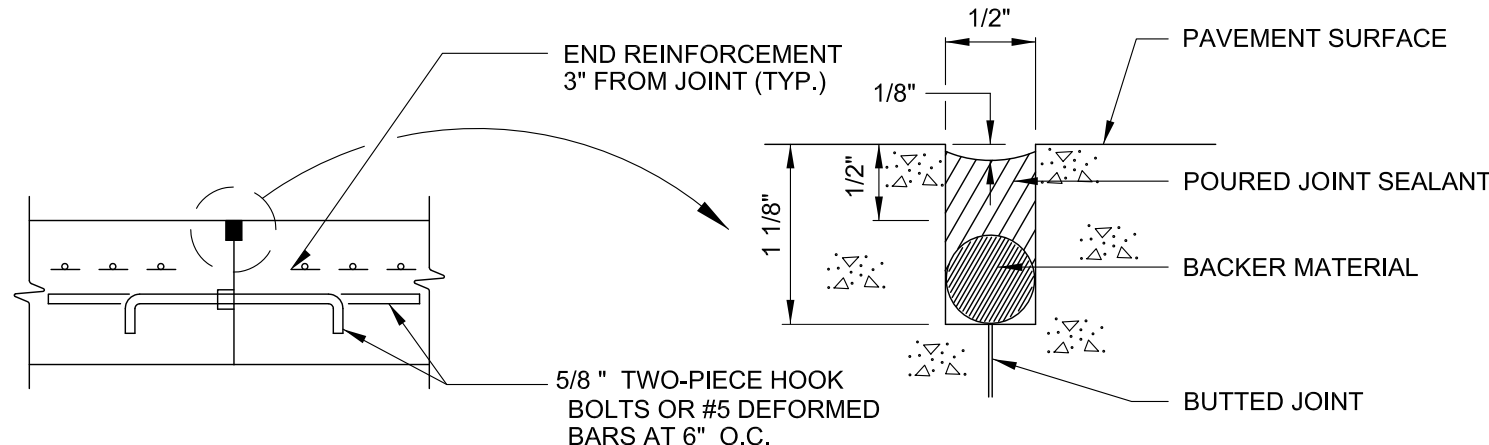
Project Number: 14049

Sheet Number: C-801

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NOTES:

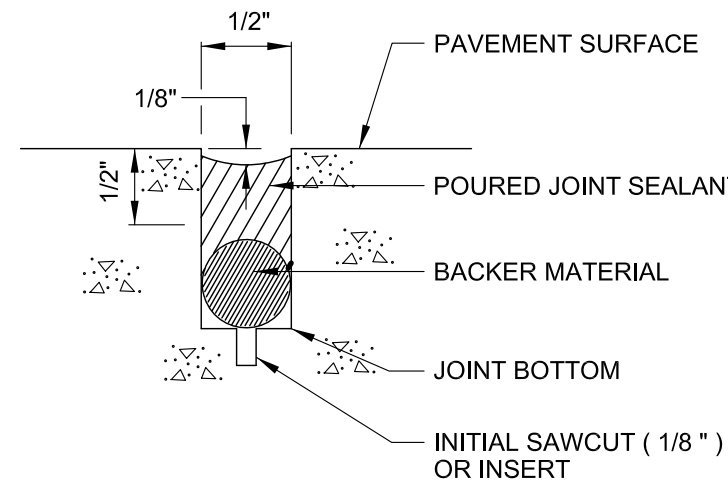
1. NORMALLY END PAVING AT PLANNED JOINTS.
2. IF PAVING IS UNAVOIDABLY INTERRUPTED MORE THAN 1/2 HOUR BETWEEN PLANNED JOINTS:
A. WITHIN 10' OF JOINT BEHIND, REMOVE CONCRETE, MODIFY TO TYPE "E".
B. WITHIN 10' OF JOINT AHEAD, REMOVE CONCRETE TO 10' FROM JOINT AHEAD AND PLACE THIS JOINT.
C. MORE THAN 10' FROM A JOINT, PLACE THIS JOINT.



PAVING INTERRUPTION

NOTE:

RELIEF GROOVE: SAW CUT, INSERT, OR FORMED GROOVE, 1/8" WIDE X 2 1/2" MIN.

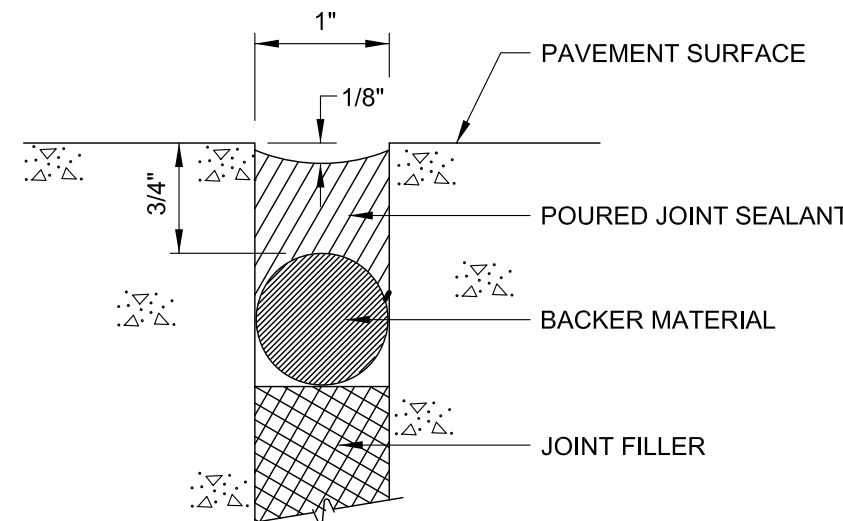


TYPE C

JOINT SEAL

NOTE:

RELIEF GROOVE: SAW CUT, INSERT, OR FORMED GROOVE, 1/8" MAX X 2 1/2" MIN. SAW CUT 1/2" MIN INTO JOINT FILLER.

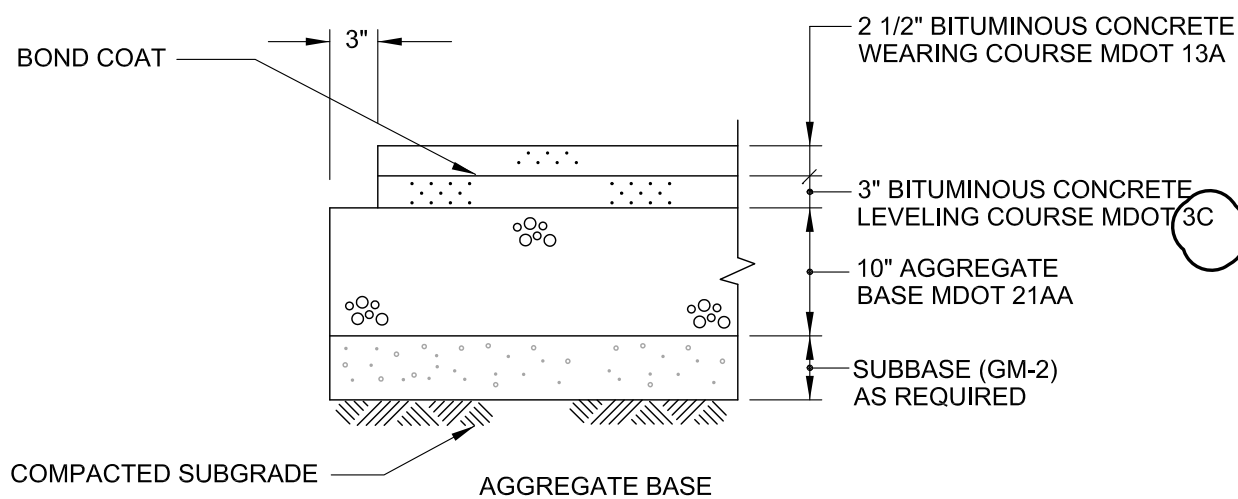


TYPE E

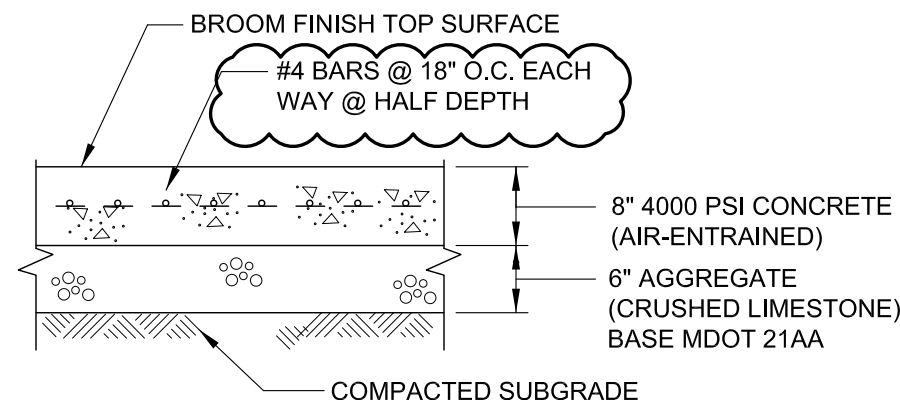
JOINT SEAL

NOTE:

PROVIDE 2" EXTRA THICKNESS OF BITUMINOUS CONCRETE AT MANHOLES, CATCH BASINS, ETC. TAPER TO NORMAL THICKNESS IN 3'-0".



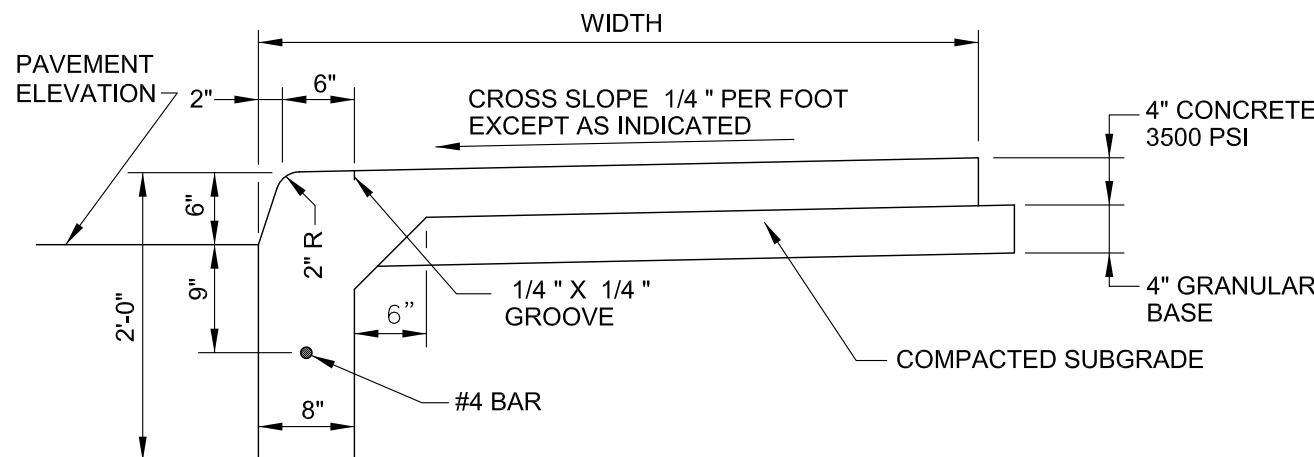
HEAVY DUTY ASPHALT PAVEMENT



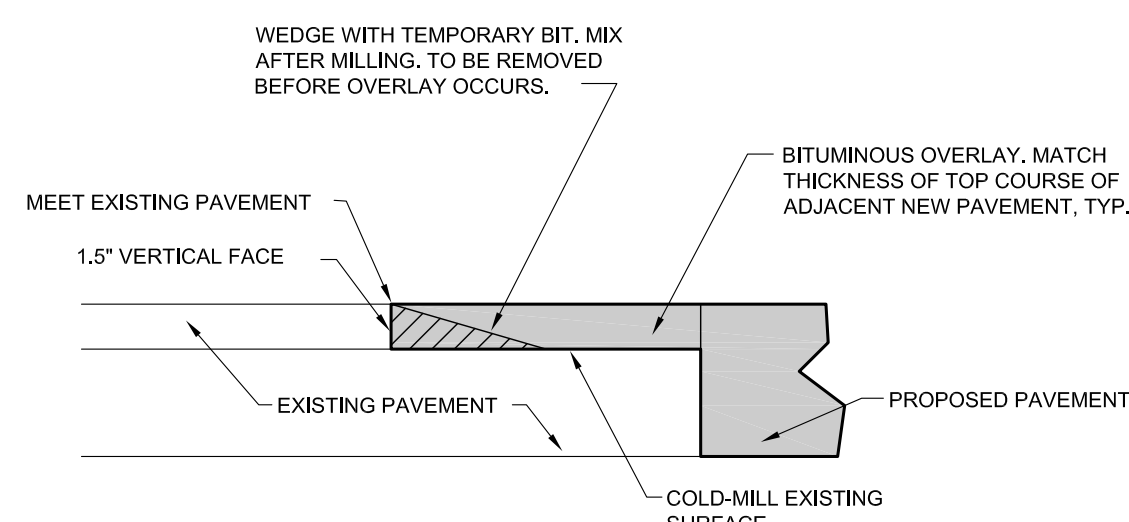
CONCRETE PAVEMENT

NOTES:

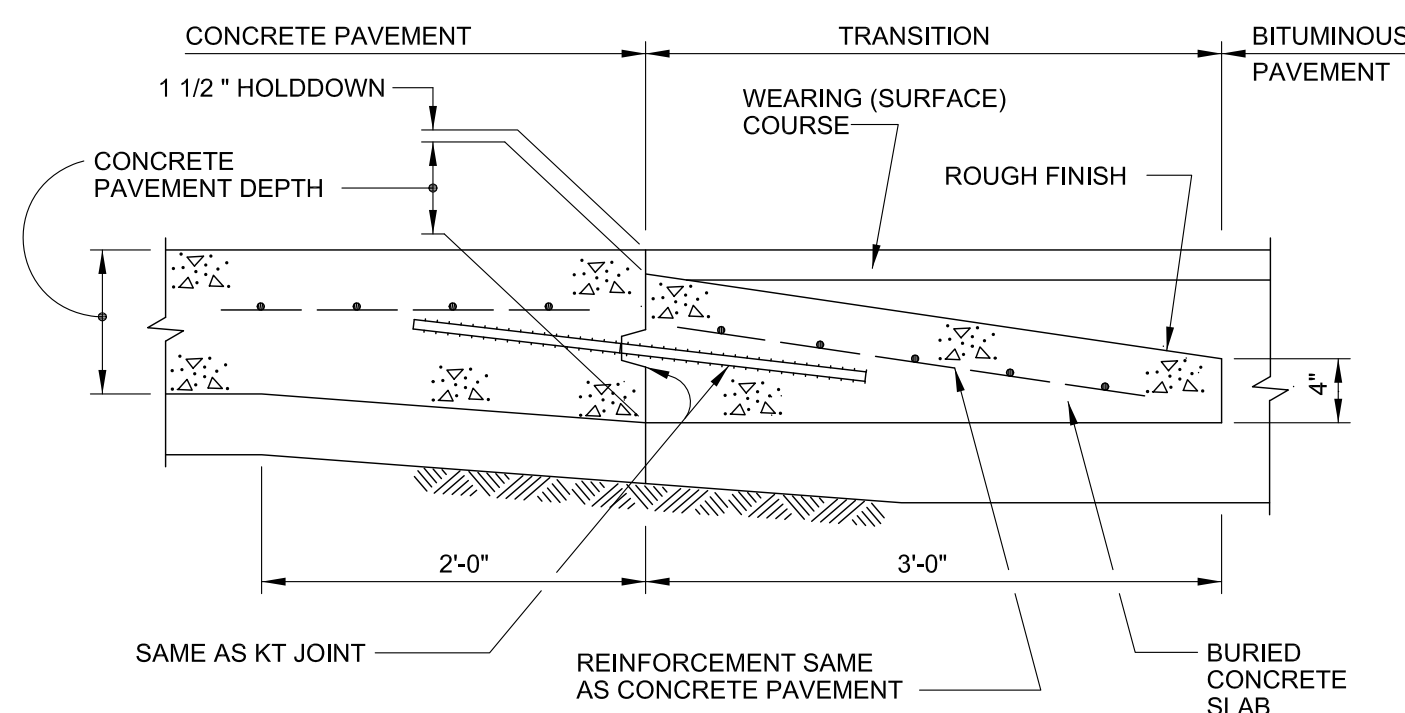
1. EXPANSION JOINTS: 1/2" WIDE JOINT FILLER, FULL DEPTH:
 - AT 50 FOOT INTERVALS TRANSVERSELY.
 - AROUND EMBEDDED ITEMS SUCH AS LIGHT BASES.
 - AT ABUTTING STRUCTURES SUCH AS BUILDINGS OR CURBS.
2. CONTRACTION (PLANE OF WEAKNESS) JOINTS: 1/4" WIDE, 1" DEEP GROOVE, ARRANGE TO FORM PANELS 6' MAXIMUM IN EITHER DIRECTION.
3. TACTILE WARNING TEXTURE: PROVIDE ON RAMPS AND NEAR TOP OF STAIRS.



INTEGRAL CURB & WALK

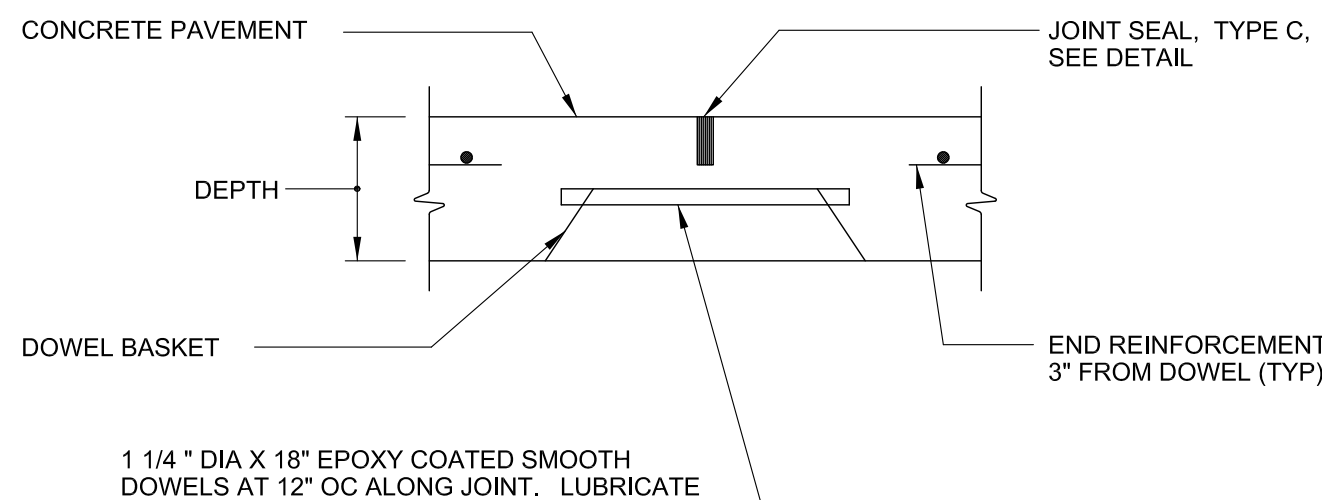


BUTT JOINT DETAIL



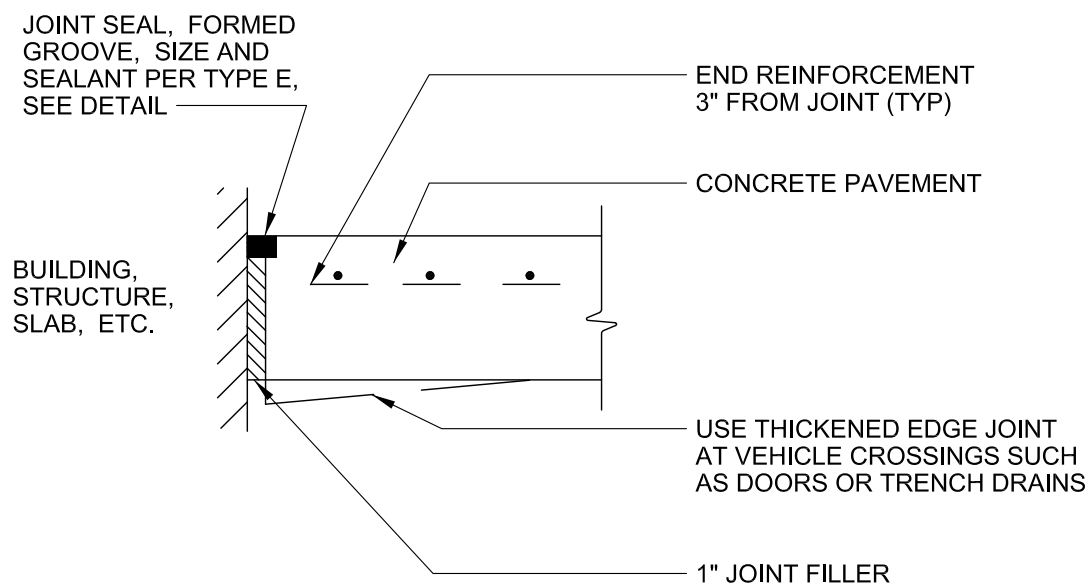
TYPE (SYMBOL) CB

TRANSITION JOINT



TYPE (SYMBOL) C

CONTRACTION JOINT

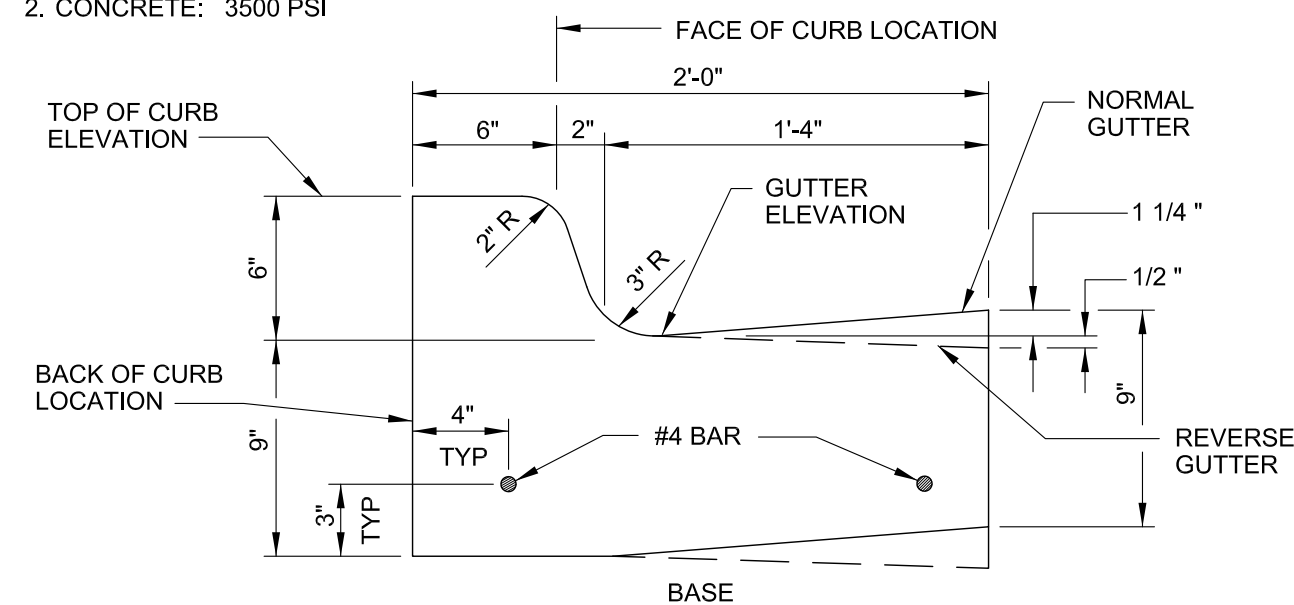


TYPE (SYMBOL) EE

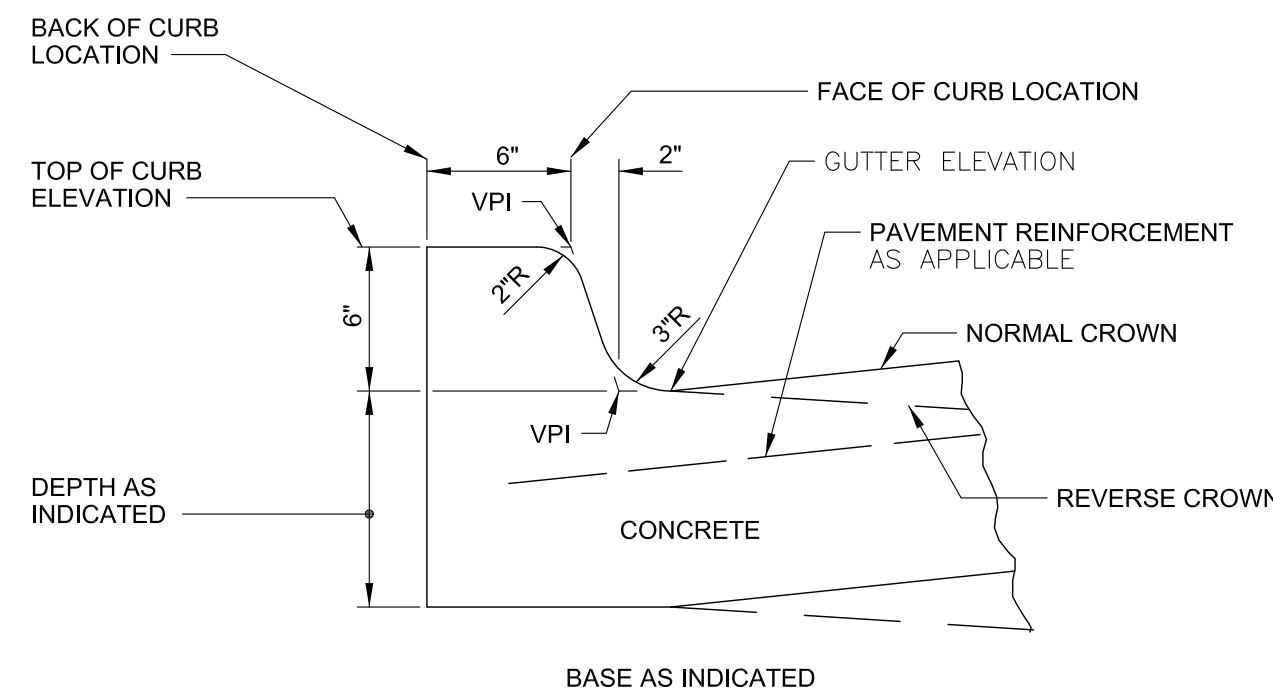
EDGE EXPANSION JOINT

NOTES:

1. USE NORMAL OR REVERSE GUTTER TO EXTEND THE SLOPE OF THE ADJACENT PAVEMENT EXCEPT AS INDICATED.
2. CONCRETE: 3500 PSI

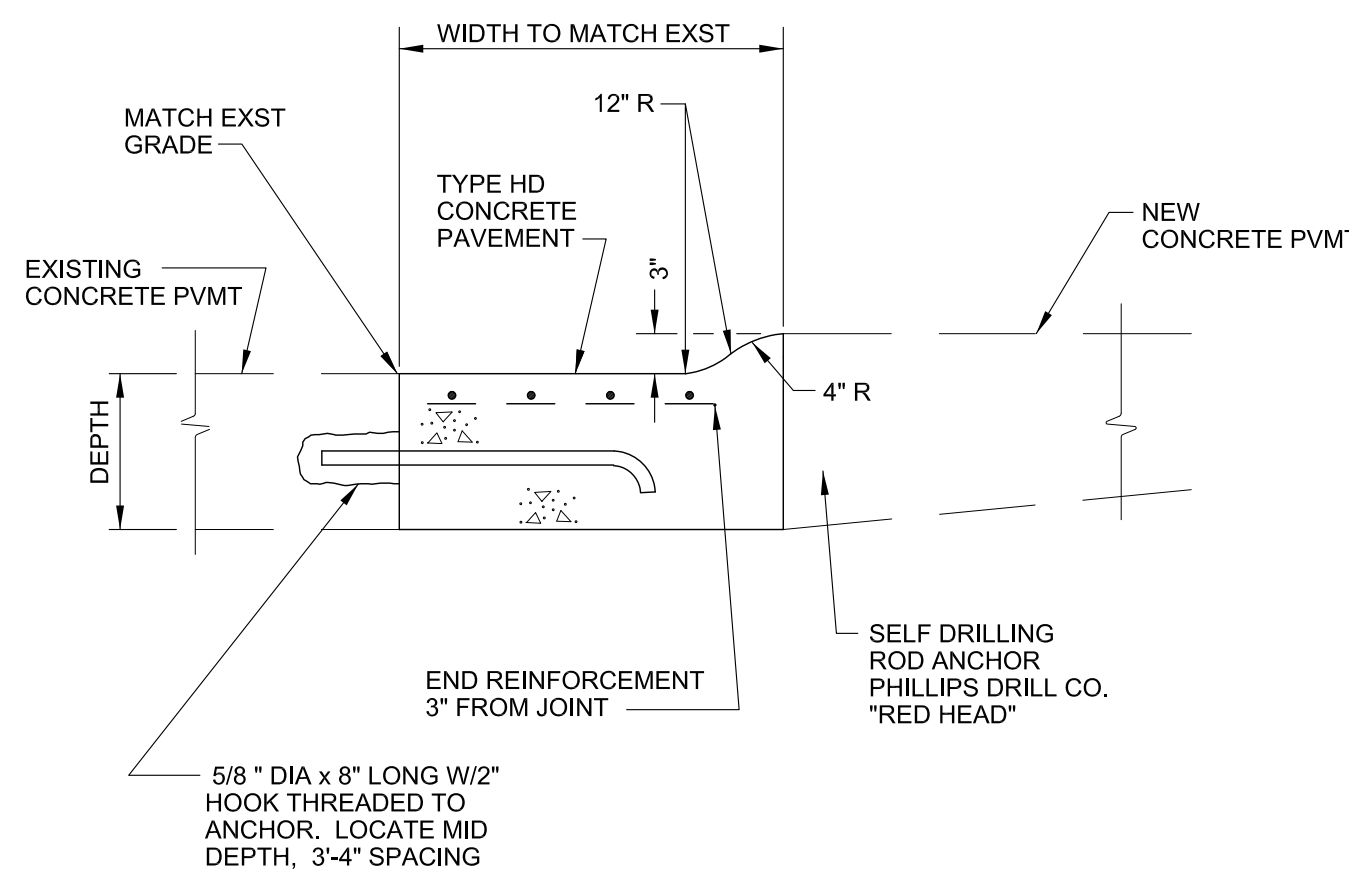
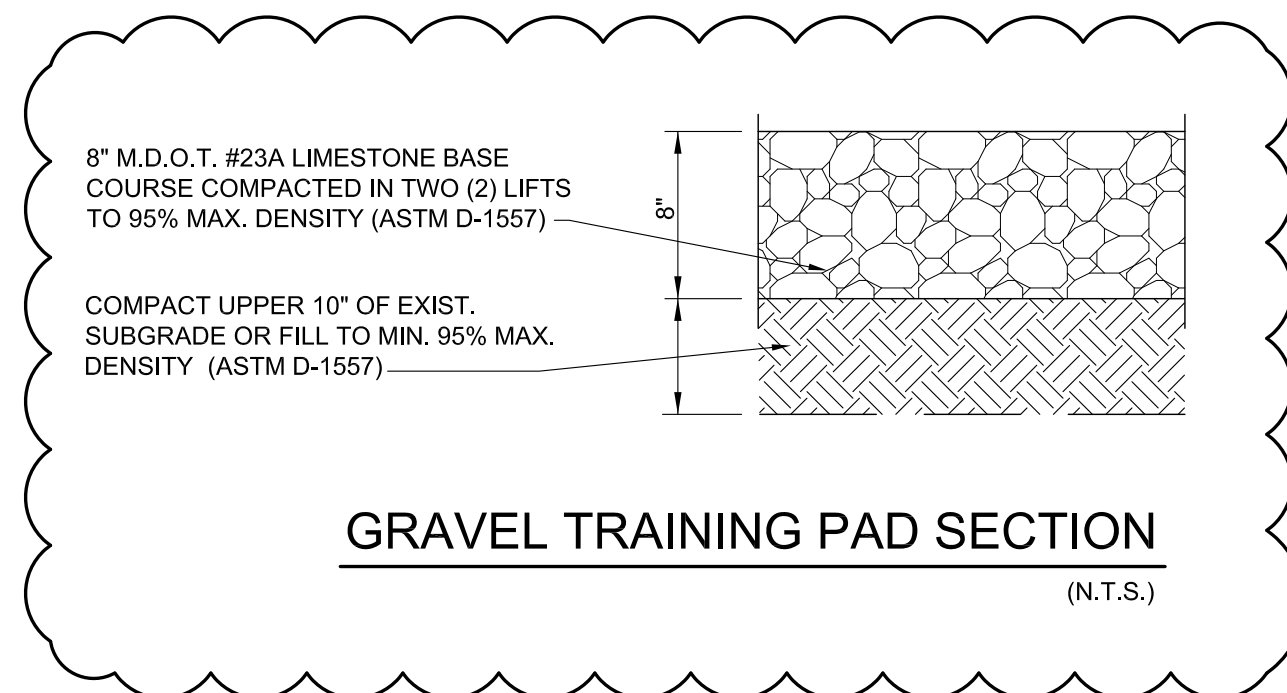


CURB & GUTTER



TYPE S

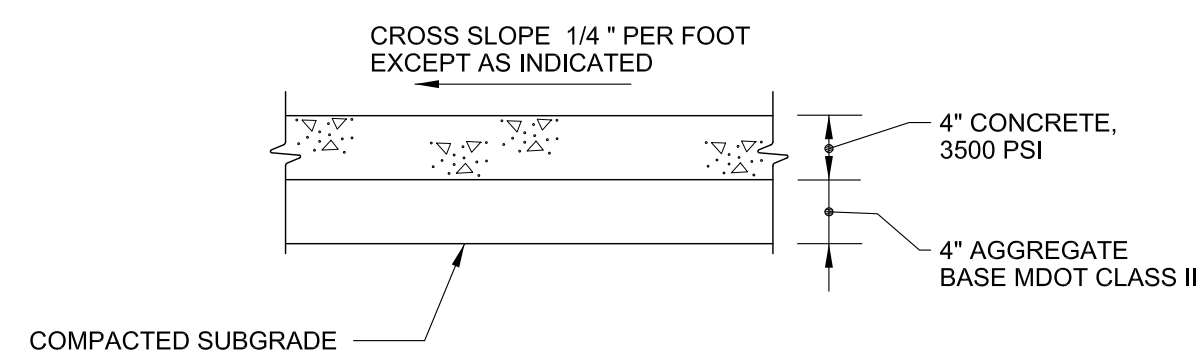
INTEGRAL CURB



MOUNTABLE CURB

NOTES:

1. EXPANSION JOINTS: 1/2" WIDE JOINT FILLER, FULL DEPTH:
 - AT 50 FOOT INTERVALS TRANSVERSELY.
 - AROUND EMBEDDED ITEMS SUCH AS LIGHT BASES.
 - AT ABUTTING STRUCTURES SUCH AS BUILDINGS OR CURBS.
2. CONTRACTION (PLANE OF WEAKNESS) JOINTS: 1/4" WIDE, 1" DEEP GROOVE, ARRANGE TO FORM PANELS 6' MAXIMUM IN EITHER DIRECTION.
3. TACTILE WARNING SURFACE: PROVIDE NEAR TOP OF STAIRS AND RAMPS.
4. BROOM FINISH



CONCRETE WALK



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10/13/14	ADDENDUM #5

Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

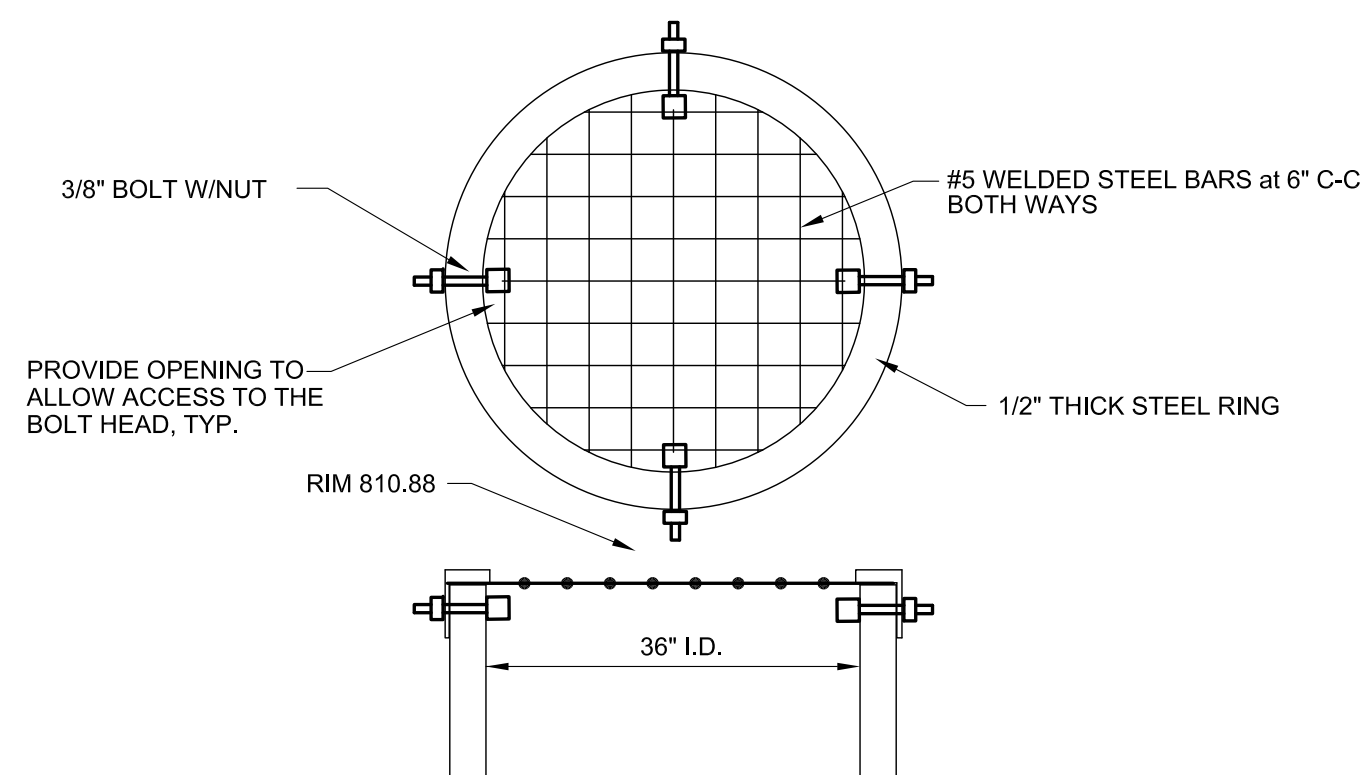
Sheet Title:

DETAILS -
STORM SEWER

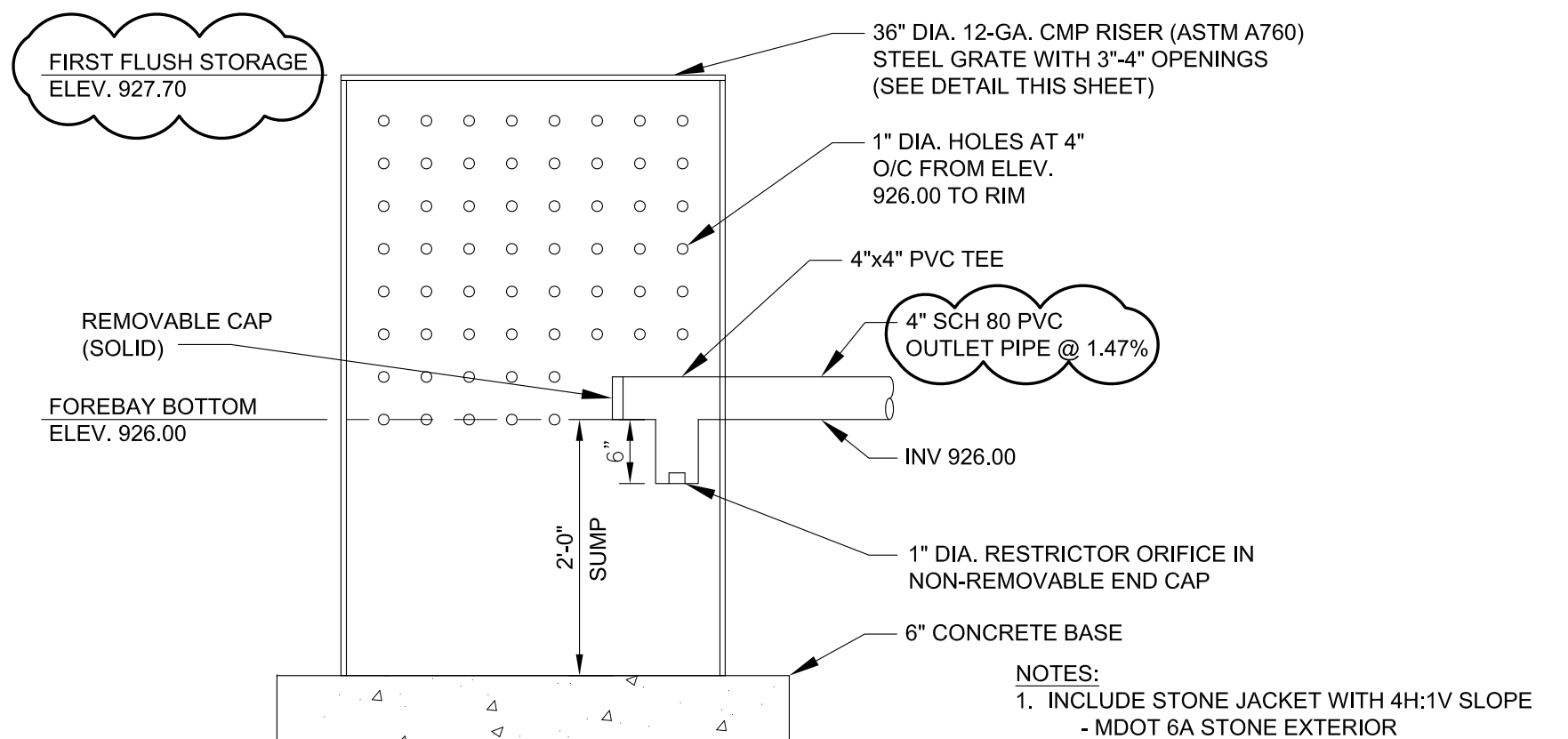
Project Number: 14049

Sheet Number: C-805

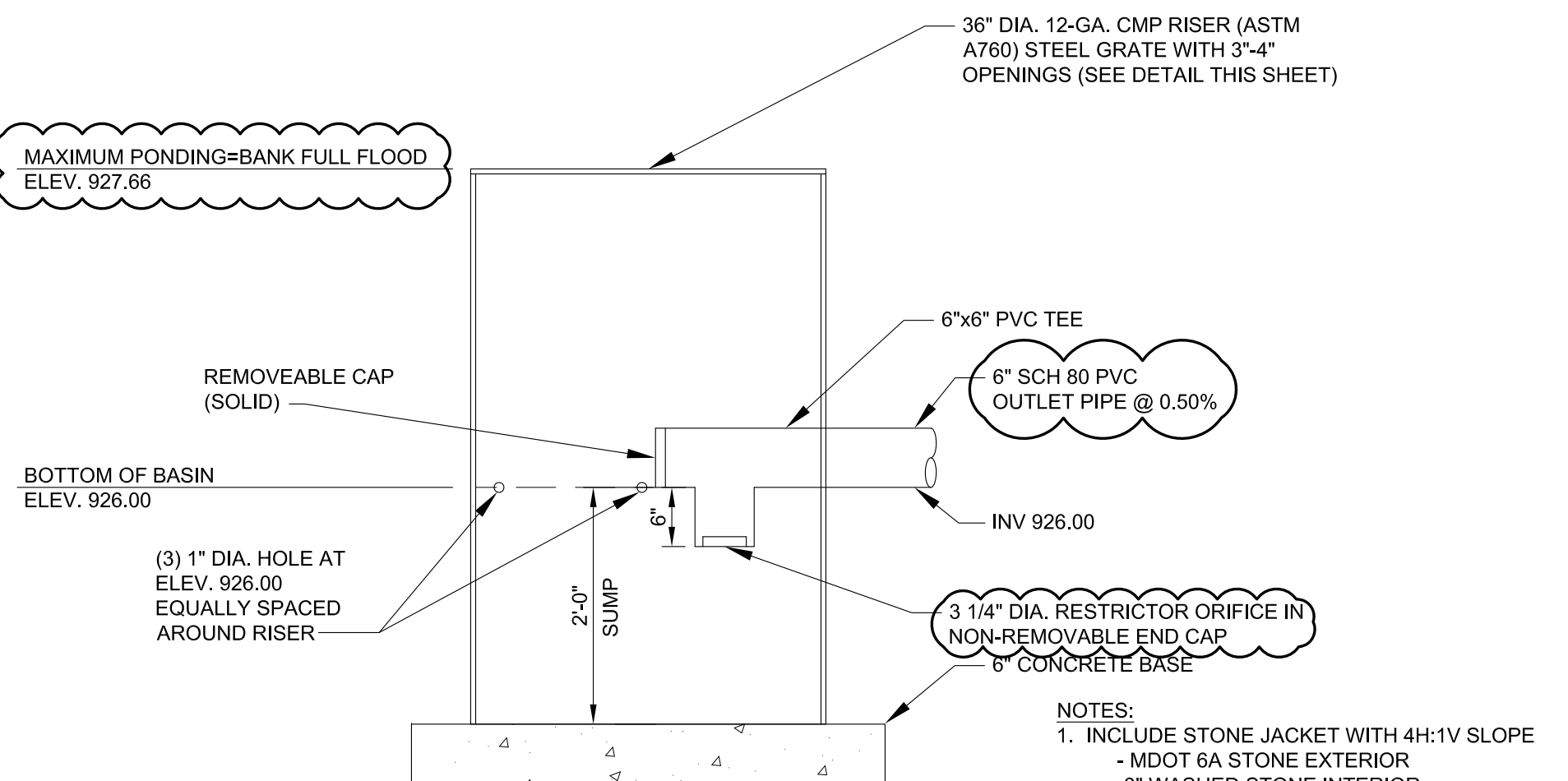
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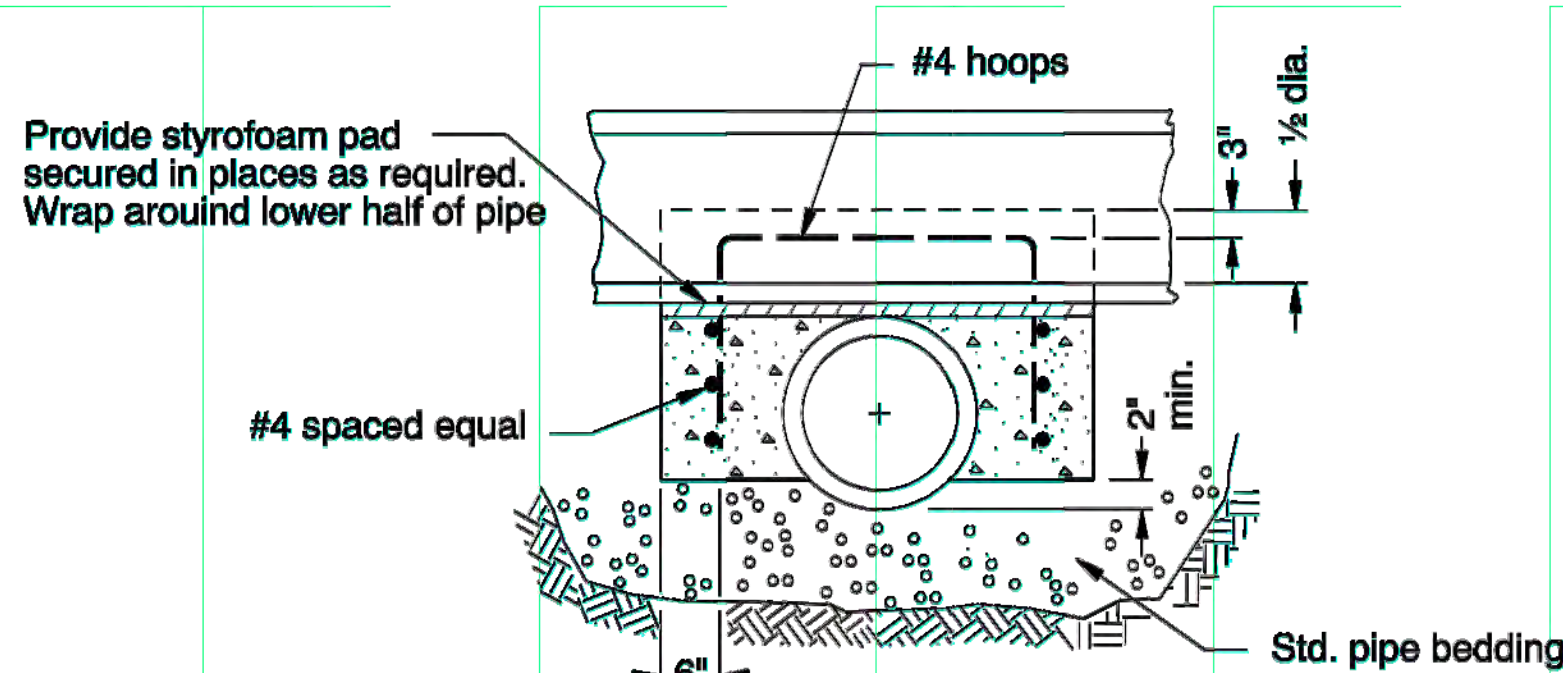
BAR GRATE FOR OUTLET CONTROL STRUCTURE
N.T.S.



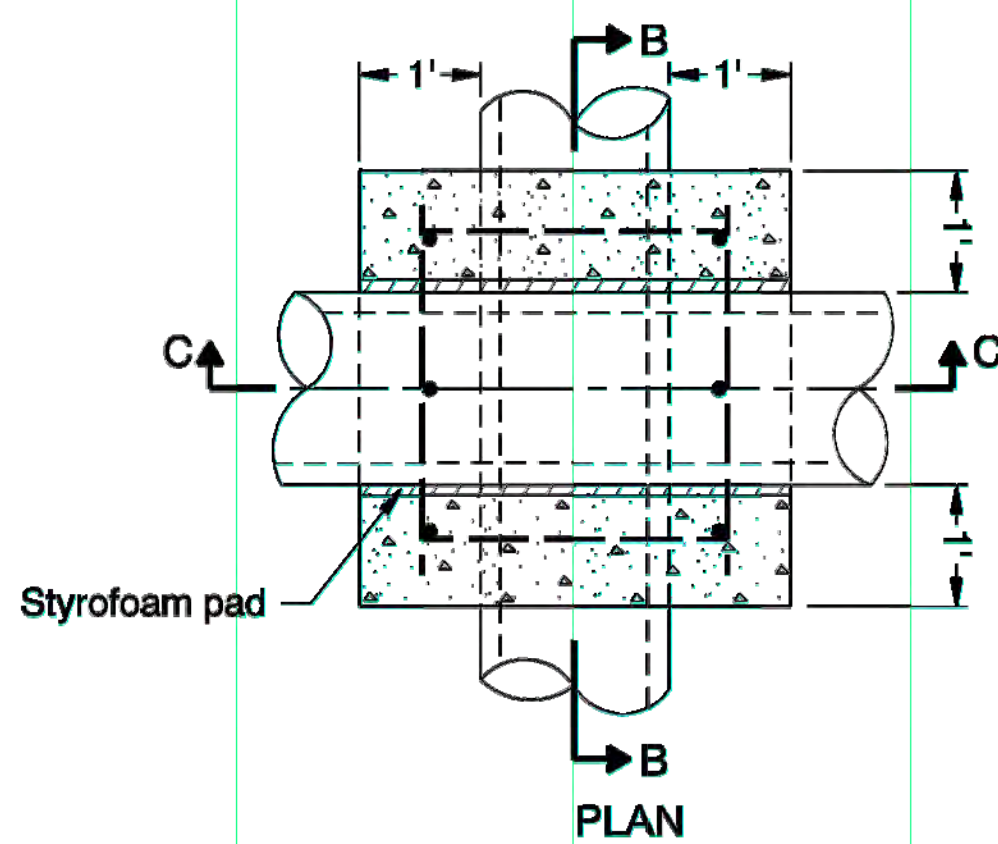
FOREBAY OUTLET STAND PIPE DETAIL
N.T.S.



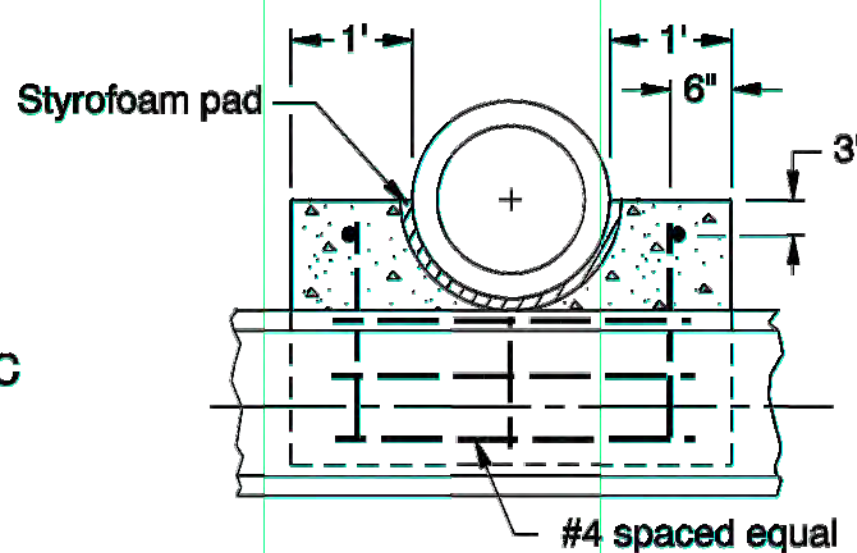
BASIN OUTLET STANDPIPE DETAIL
N.T.S.



SECTION C-C



SADDLE

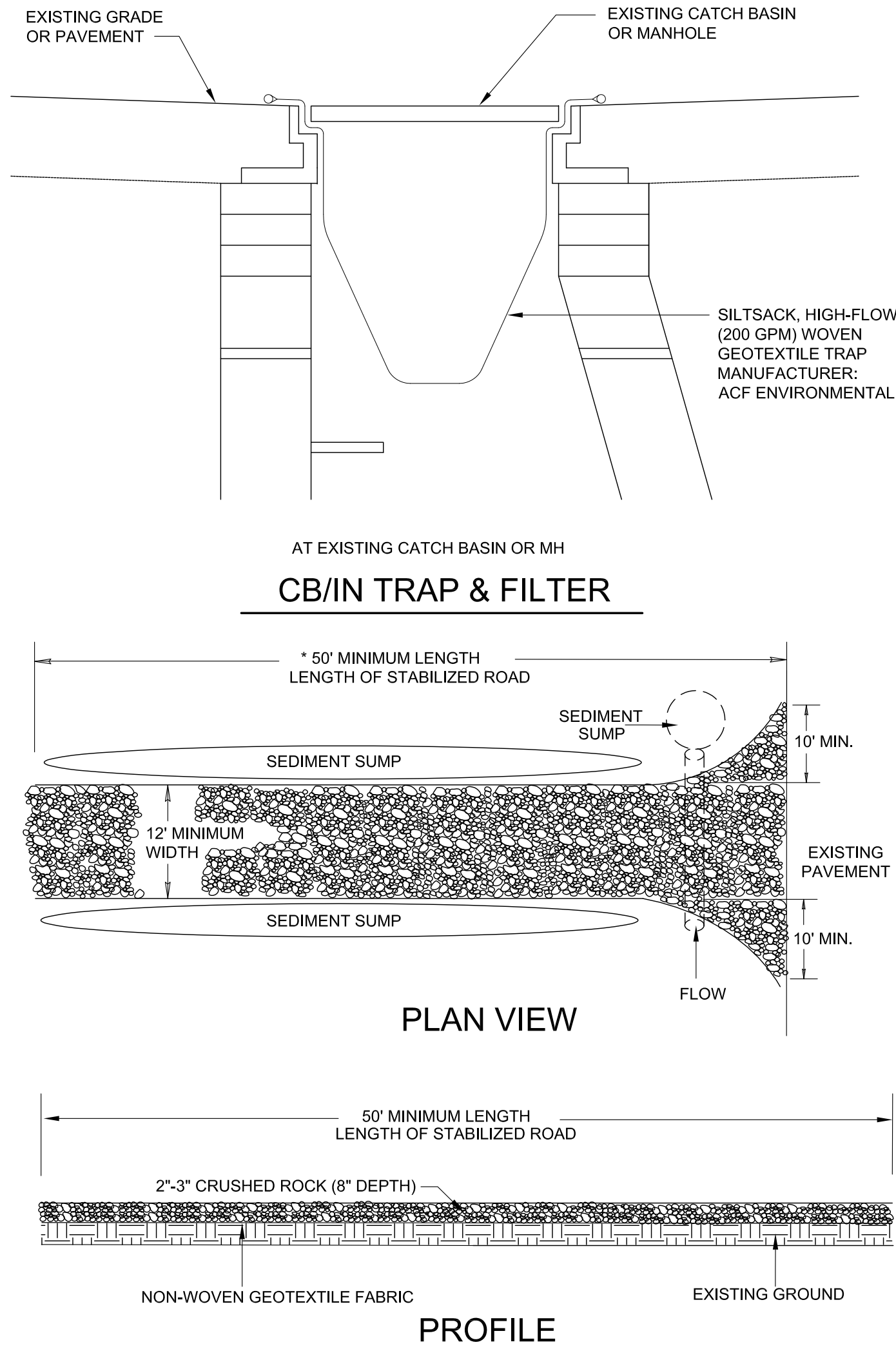
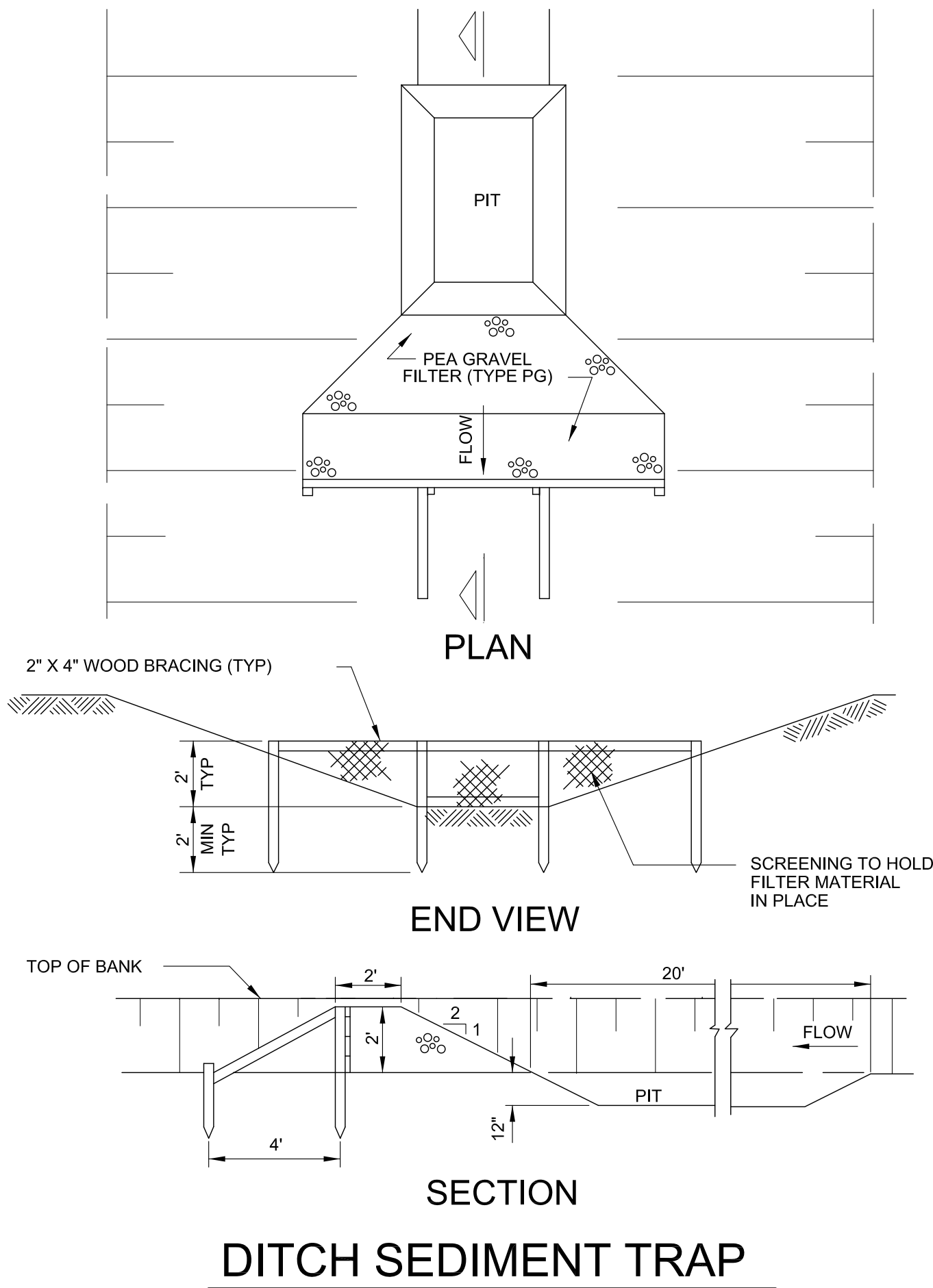
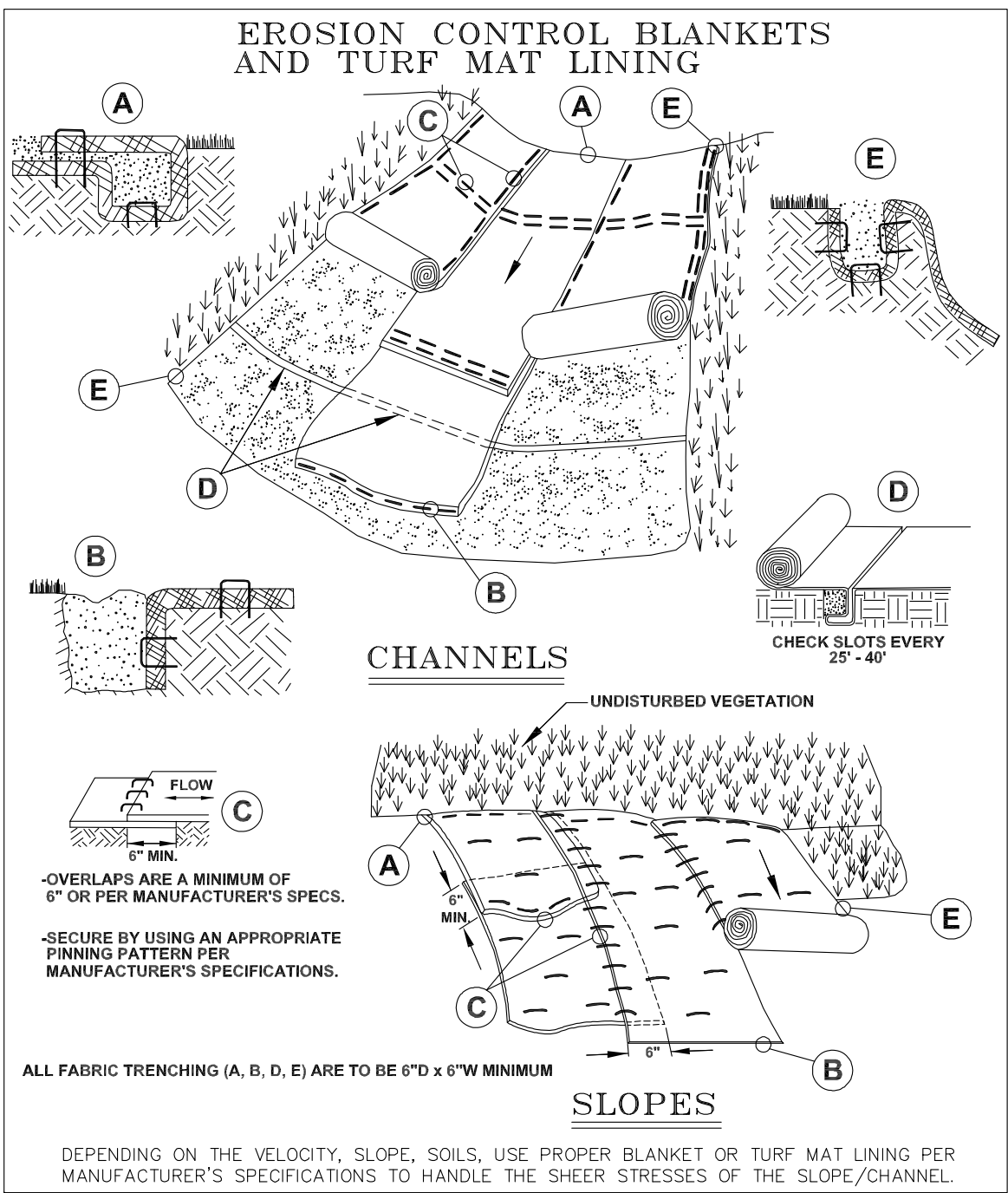
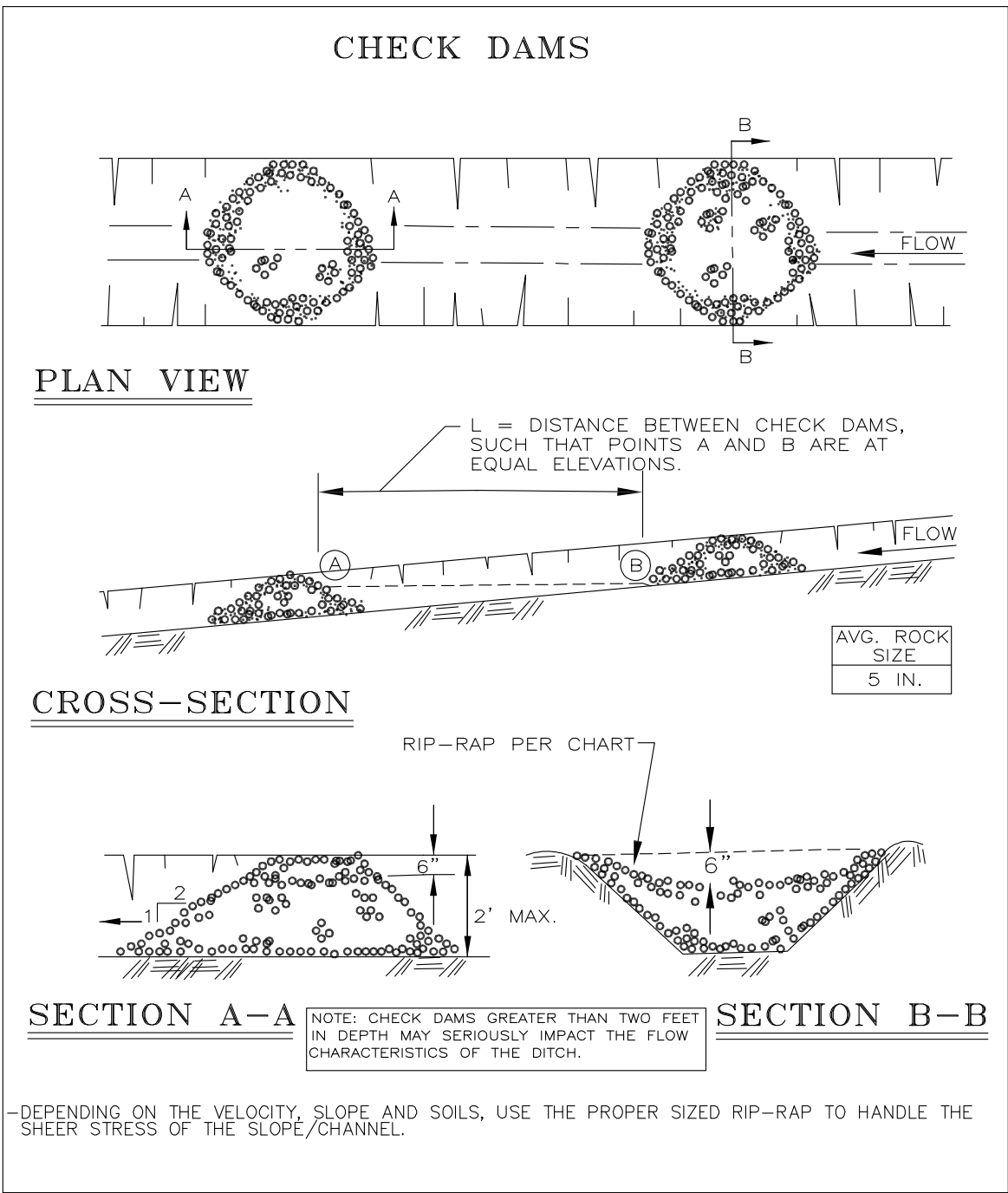
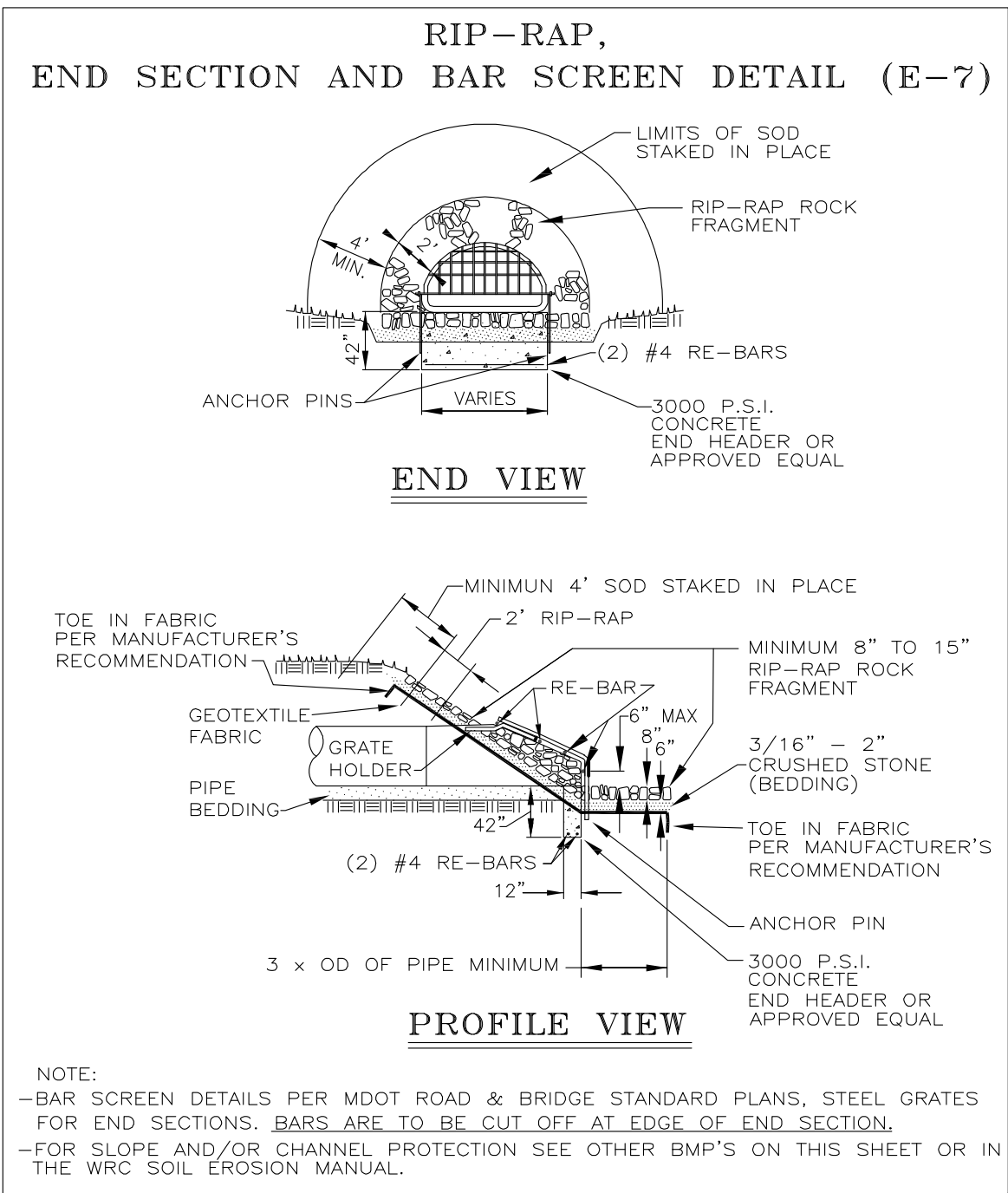


SECTION B-B

GENERAL NOTES FOR ALL DETAILS:

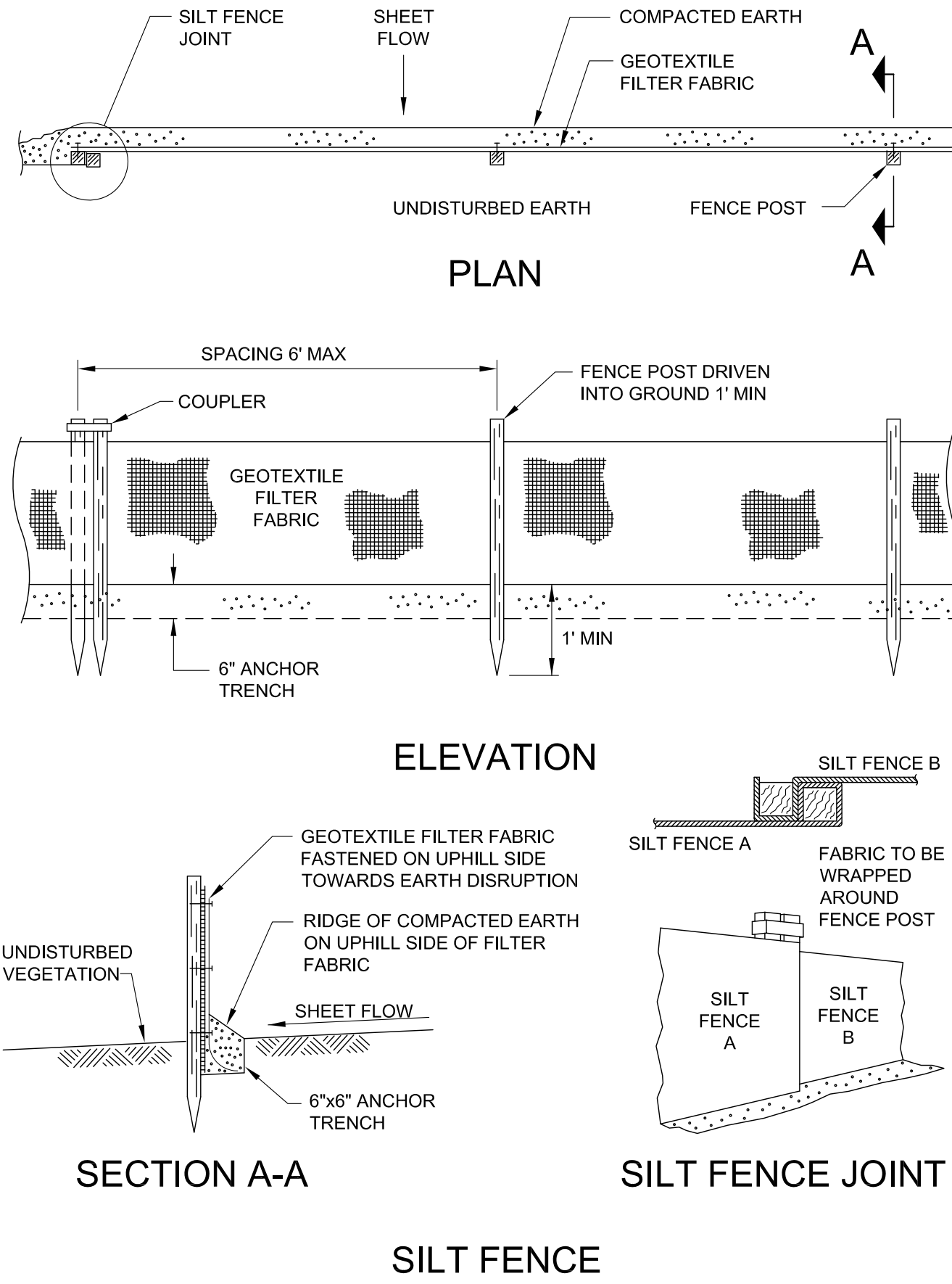
1. All concrete shall be Commercial Grade Concrete.

M:\2014\14049 Dexton Township New Fire Substation No 2\05 Civil and Survey\C-806 DETAILS - SOIL EROSION & SED CONTROL.dwg Fri, 10 Oct 2014 - 11:16pm



- NOTES:
1. ESTABLISH STABILIZED CONSTRUCTION ENTRANCE PRIOR TO THE INITIATION OF SITE CONSTRUCTION ACTIVITIES.
 2. CARE SHOULD BE TAKEN TO PREVENT MATERIAL MOVEMENT INTO ADJACENT WETLANDS/WATERBODIES.
 3. CARE SHOULD BE TAKEN TO MAINTAIN EXISTING ROADSIDE DRAINAGE VIA CULVERT INSTALLATION, WITH SEDIMENT SUMP PLACED DOWNFLOW OF CULVERT.

TEMPORARY STONE ACCESS DRIVE



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Key Plan:

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Project:
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10/13/14	ADDENDUM #5

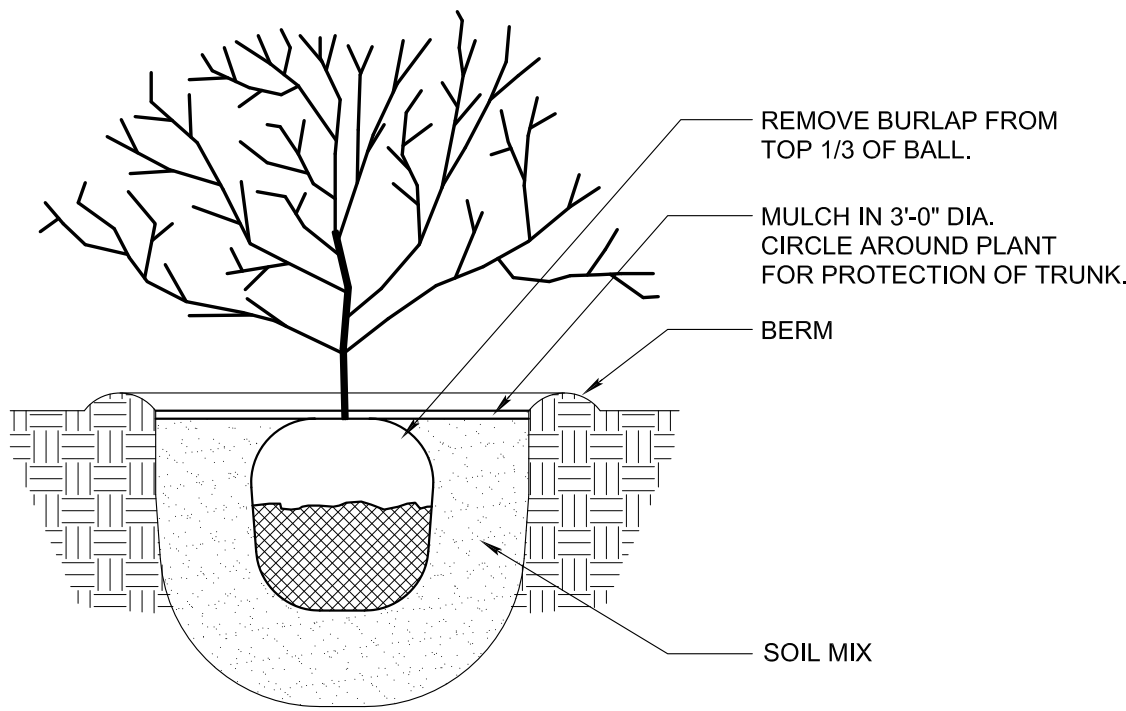
Drawn: S. MANOS
Checked: C. LEACH
Approved: C. LEACH

Sheet Title:
DETAILS - SOIL EROSION & SEDIMENT CONTROL

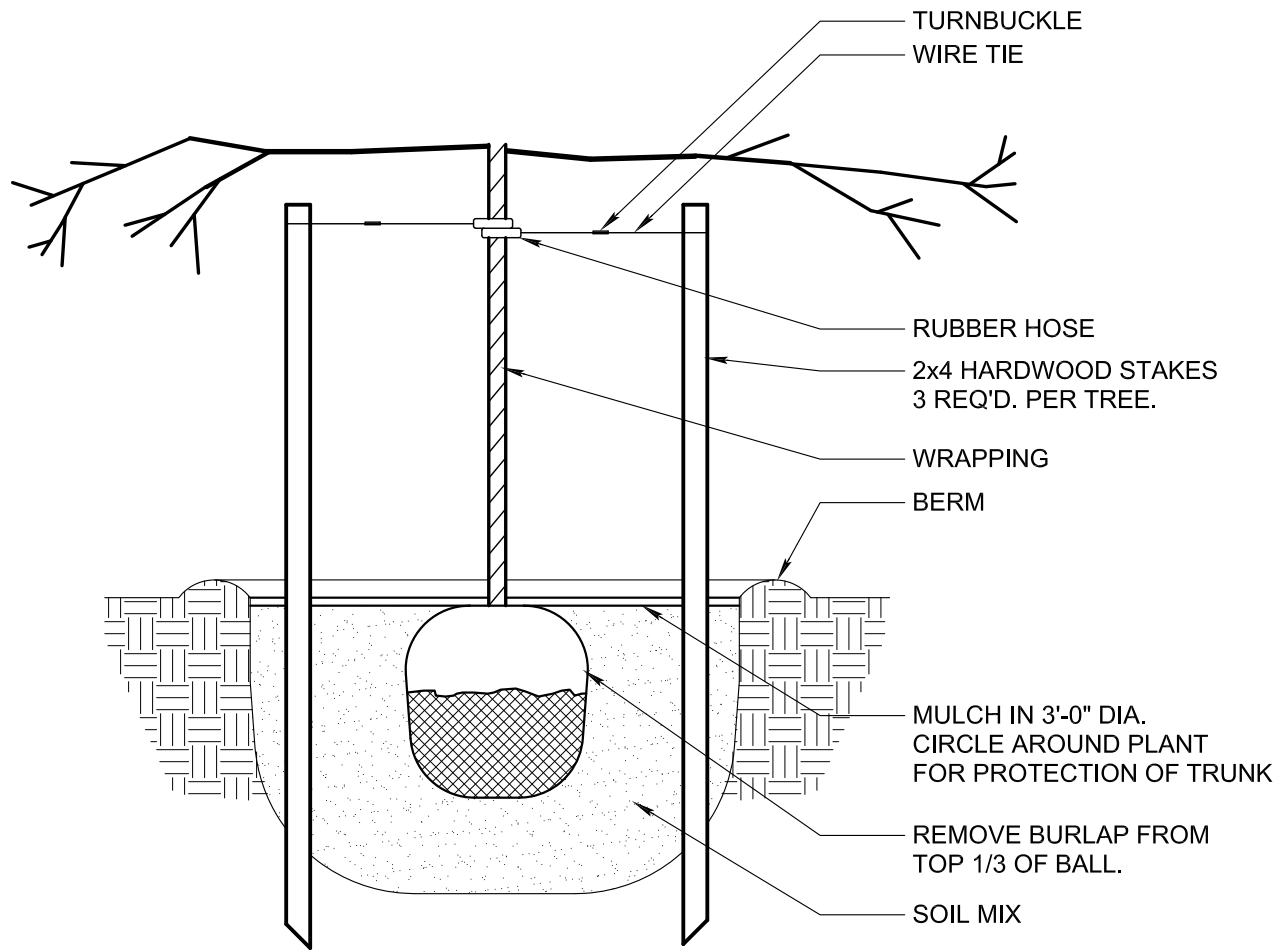
Project Number: 14049

Sheet Number: **C-806**

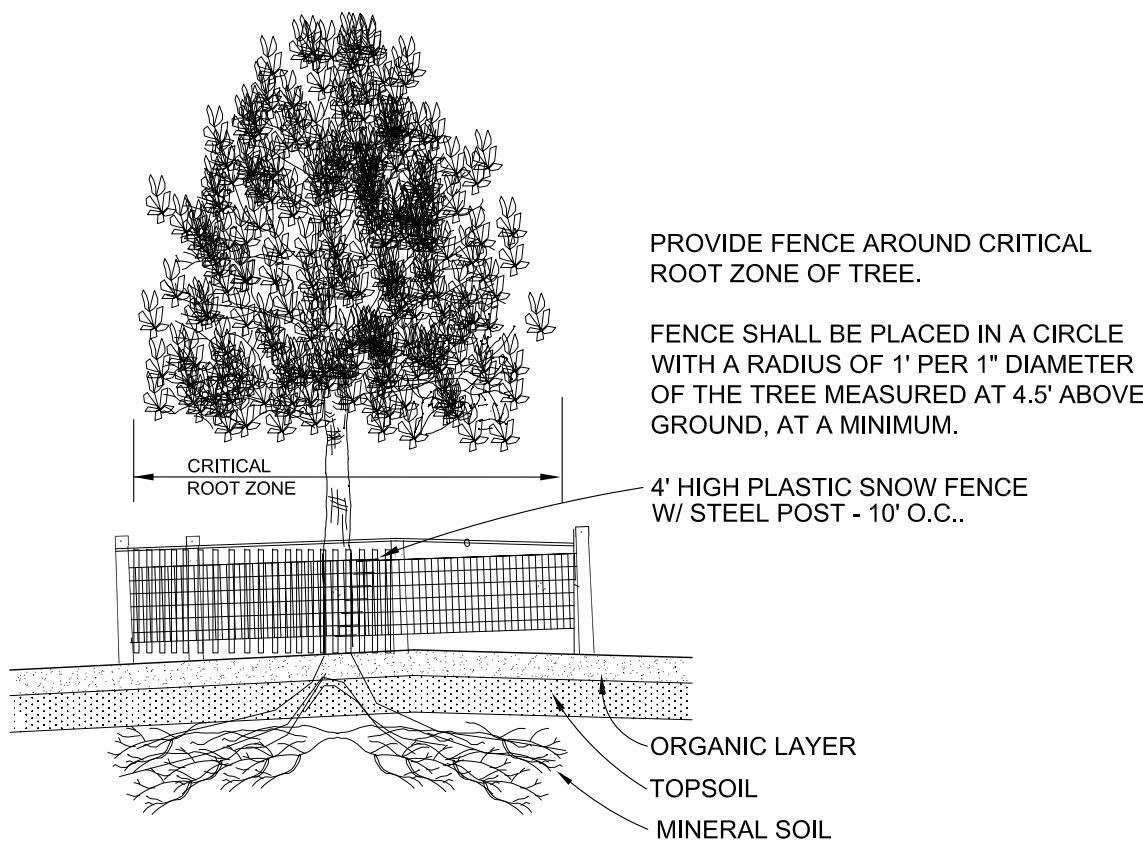
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SINGLE SHRUB PLANTING



TREE PLANTING



TREE PROTECTION DETAIL

TREE PROTECTION NOTES:

TREE PROTECTION SHALL BE ERECTED PRIOR TO START OF CONSTRUCTION ACTIVITIES, AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.

NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE DRIP LINE OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO PLACING SOLVENTS, BUILDING MATERIAL, CONSTRUCTION EQUIPMENT, OR SOIL DEPOSITS WITHIN DRIP LINES.

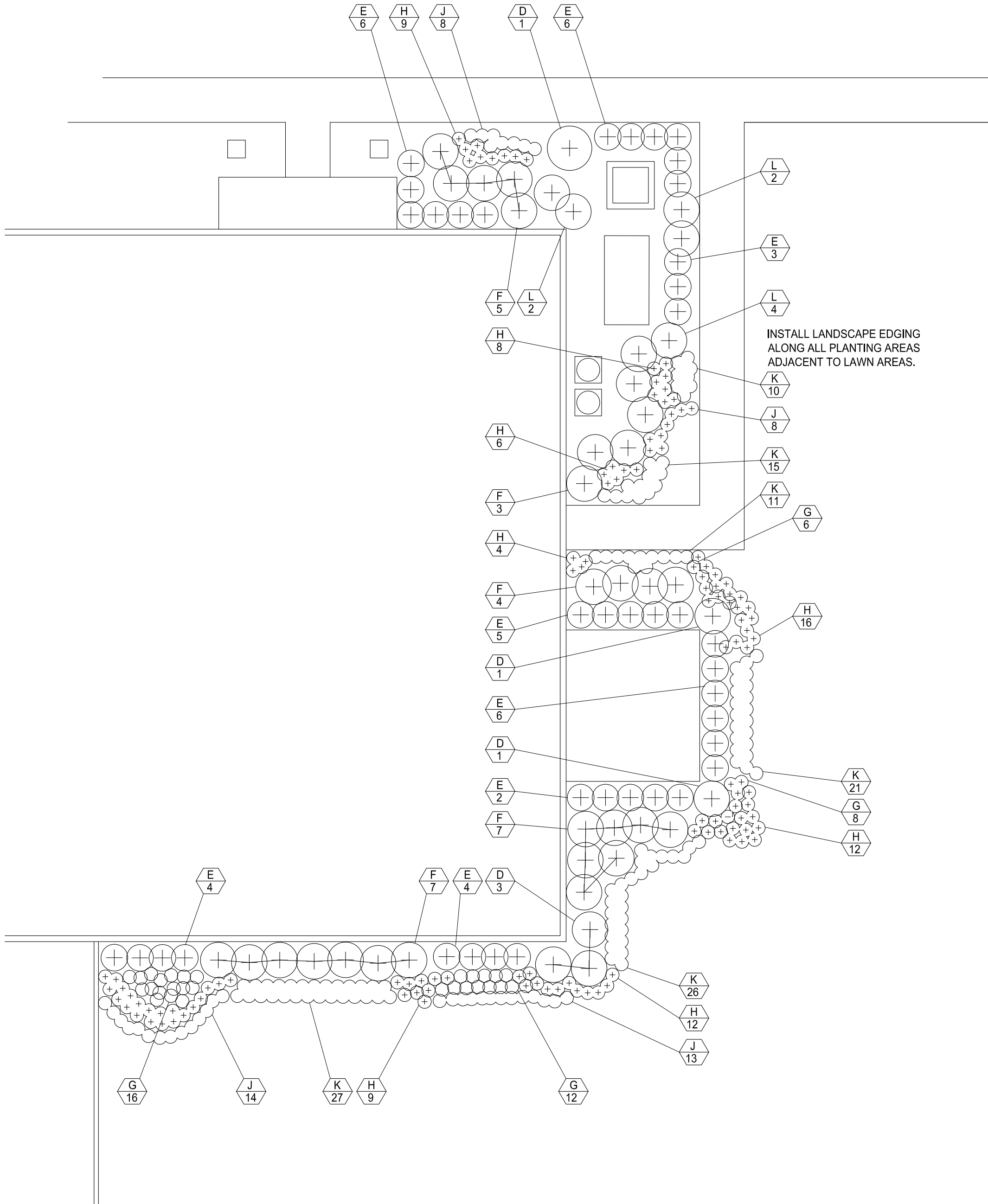
GRADE CHANGES MUST BE MINIMAL WITHIN THE DRIP LINE OF PROTECTED TREES.

DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY DEVICE OR WIRE TO ANY REMAINING TREE.

ALL UTILITY SERVICE REQUESTS MUST INCLUDE NOTIFICATION TO THE INSTALLER THAT PROTECTED TREES MUST BE AVOIDED. ALL TRENCHING SHALL OCCUR OUTSIDE OF THE PROTECTIVE FENCING, WHERE POSSIBLE.

REGULATED TREES LOCATED ON ADJACENT PROPERTY THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITIES MUST BE PROTECTED.

PLANT LIST				
TYPE	QUANTITY	COMMON NAME	SCIENTIFIC NAME	SIZE
B	3	RED MAPLE	Acer rubrum	2 1/2" B & B
C	1	SWEET GUM	Liquidambar styrum	2 1/2" B & B
D	6	MAIDEN GRASS	Miscanthus sinensis 'Gracillimus'	No. 5 CONTAINER
E	39	GREEN MOUNTAIN BOXWOOD	Buxus 'Green Mountain'	18" B & B
F	26	RUSSIAN SAGE	Perovskia atriplicifolia	No. 2 CONTAINER
G	42	LAVANDER	Lavandula angustifolia	No. 2 CONTAINER
H	76	PURPLE CONEFLOWER	Echinacea purpurea	No. 2 CONTAINER
J	43	SWEET WOODRUFF	Galium odoratum	3 1/2" POT
K	110	PACHYSANDRA	Pachysandra termanilis	No. 1 CONTAINER
L	8	JAPANESE PIERIS	Pieris japonica	18" B & B
N	8	WHITE SPRUCE	Picea glauca	6" B & B
P	4	COLORADO SPRUCE	Picea plungens	8" B & B
Q	4	SNOWDRIFT CRAB	Malus 'snowdrift'	2" CAL. B & B
R	6	DOUGLAS FIR	Pseudotsuga	8-10' HT. B & B
S	5	PRAIRIFIRE FLOWERING CRAB	Malus 'prairifire'	2" CAL. B & B
T	3	COLORADO BLUE SPRUCE	Picea pungens 'glauca'	8-10' B & B



LANDSCAPE ENLARGED PLAN
SCALE: 3/32" = 1'-0"

LANDSCAPE NOTES

- ALL LIVING MATERIALS SHALL HAVE A (1) YEAR REPLACEMENT WARRANTY.
- ALL DISEASED, DAMAGED, OR DEAD MATERIALS SHALL BE REPLACED IN ACCORDANCE WITH THE DEXTER TOWNSHIP ZONING ORDINANCE AS REGULAR & CONTINUED MAINTENANCE.
- PROVIDE TREE PROTECTION AT ALL TREES THAT ARE TO REMAIN WITHIN THE LIMITS OF DISTURBANCE AS SHOWN ON C-200.



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10/13/14	REV. FINAL SPA/FINAL ENG.
10/13/14	ADDENDUM #5

Drawn: K. GILSON
Checked: E. JOHNSON
Approved: C. LEACH

Sheet Title:
DETAILS -
LANDSCAPING

Project Number: 14049

Sheet Number: L-801

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